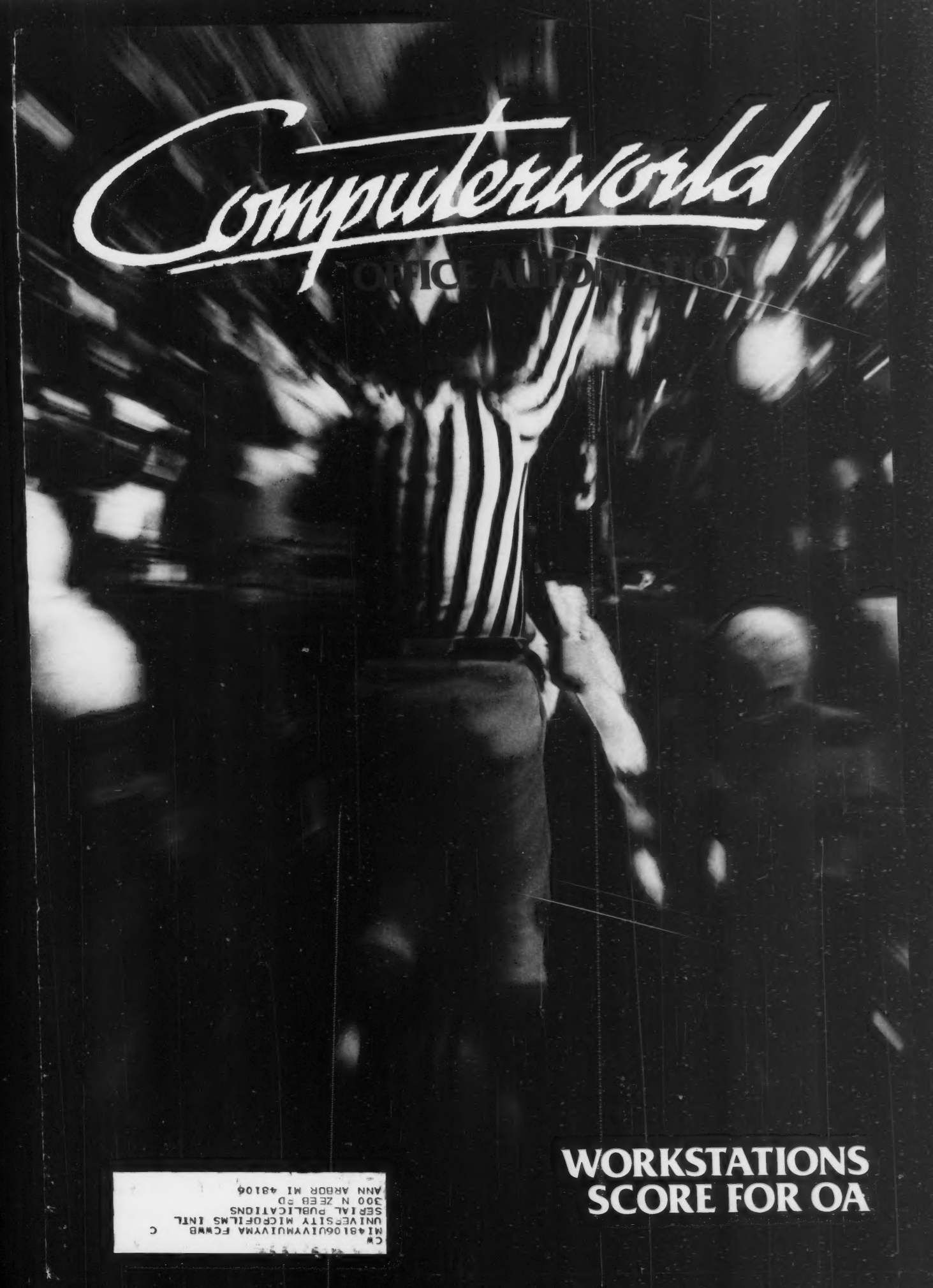

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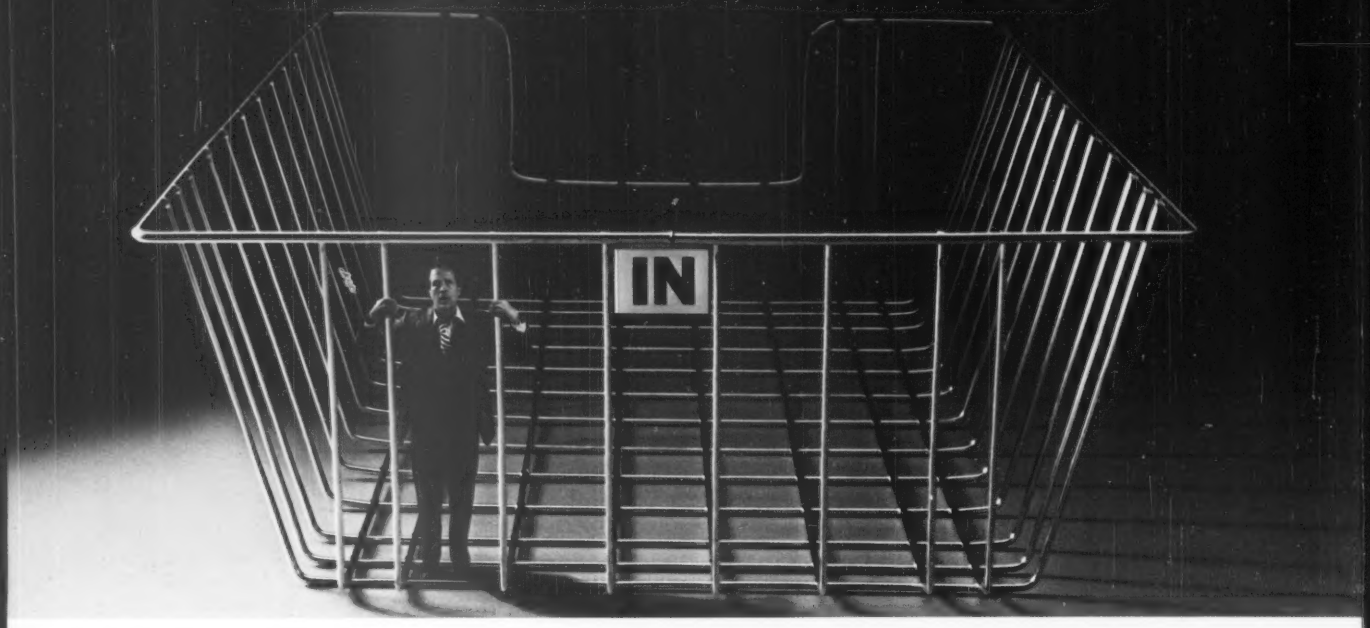

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EDITORIAL

Thousands of software programs are currently available for the IBM Personal Computer. All told, it would probably take a computer to count all the programs available for the current crop of microcomputers and office workstations. But quantity does not mean quality.

In the midst of all this plenty, users are finding themselves coming up empty and falling back on that old reliable mainstay — their own resources. General-purpose software applications all too often fall short of meeting the specific needs of various departments in an organization. As yet, vertical application products are not sophisticated enough to meet these needs, either.

This situation leaves users caught between the cracks; their only way out seems to be to custom-tailor their own software packages. The success of attempts to increase functionality of commercially marketed packages varies widely — largely according to the support staff available and the amount of time that can be given to each project.

Some organizations find themselves weaving several available tools into a customized package. Others may take a basic horizontal software product and write the necessary code to satisfy a specific need. In-house doctoring of software is an increasing necessity; without it, the program — and possibly even the hardware — may never be utilized to its full capabilities. They may not even be used at all.

Vendors, while sympathetic, appear to be more interested in presenting new packages and new applications than in redesigning current packages for specific clients. One way out of this dilemma may be for vendors to build into the initial product capacity that would lend itself to increasing the package's original capabilities.

The lack of software precisely suited to the needs of the user may be a major contributing factor in the number of micros that sit and gather dust in corners. If the system isn't immediately helpful, people aren't going to use it. This is something that vendors and the DP center and its support staff need to remember when they plan for new systems and introduce them into the organization.

In an interesting offshoot of this in-house tailoring problem, many ad hoc programs are being designed by individual end users. Disaster can strike when that person leaves the company and takes the information with him. Organizations increasingly report that end users are writing their own programs or making changes to them. Without any formal plan or reporting procedures, this information often exists only in that person's head. Fellow workers, left in the lurch, find themselves without the knowledge they need to access or change programming information.

This is an example of what can happen when no formal plan exists or when the DP department lets computing power out of its control. Users, vendors and management information systems managers all need to be aware of this costly possibility.

LETTERS

INTEGRATED SOFTWARE STANDARD

"Integrated Multifunction Software" [CW OA, Aug. 15] struck very close to home.

In the multiuser world, we have embarked on an enhanced data interchange mechanism (not just a format) for third-party software packages.

This is a voluntary effort that has been undertaken by leading software firms in this marketplace. The mechanism is called the Integrated Software Information Standard (Isis).

The technical environment is more conducive to this effort than in the MS-DOS world. Here we have 32-bit processors; large memory spaces of 1M to 8M bytes; big, fast disks; and a standard multitasking operating system in Unix.

The proposed Isis standard includes the data interchange standard, and the intelligent user/server mechanism that allows one vendor's package to locate and request services from another vendor's package.

The Isis committee includes Access Technology, Quadratro, Software Express, and Unify Corp., with public access being channeled through Strayton Corp. in Santa Clara, Calif.

The standard will go out to vote in October, with demonstrations planned for Fall Comdex.

Interested parties may acquire a copy of the proposed standard for $20, from:

Cathy Cook
Strayton Corp.
Suite 299
3333 Bowers Ave.
Santa Clara, Calif. 95051.

I enjoy *Computerworld OA*. Keep up the good work!

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OA FORUM

By C.S. Thachenkary and S.E. Harris

The number of office workers using CRTs is now estimated at 7 million to 10 million people. As this number continues to rise, attention is focusing on possible health hazards in the automated office. Early reports of health complaints ranged from eyestrain all the way to spontaneous abortions and fetal deformities. Labor unions have reacted to these complaints by calling for investigations; fear exists that, because the long-term effects of working with CRTs are not well documented, the health of CRT users may be threatened.

Canada has established a task force that has conducted extensive hearings and made a number of recommendations for introducing office automation. In the U.S., at least six states have either enacted legislation (as was the case in Maine and Connecticut) or (as in New York and Illinois) have under consideration bills that will mandate certain guidelines for the use of CRTs in the office.

Many employers, concerned about costs, have adopted the undesirable attitude of wait-and-see. Such organizations can expect future legislative actions that could prove to be far more costly than any that might be undertaken now to tackle the problem.

CRT-related health complaints can be grouped into the following categories:

• Visual strain: The most common complaint is eyestrain from constant exposure to the screen. Typical symptoms consist of watery eyes, red eyes and blurred vision. Cases of cataracts and detached retinas have also been reported.

• Muscle fatigue: Backaches and neckaches, shoulder pain, leg cramps and sore arms and fingers have been reported.

• Reproductive abnormalities: One of the most worrisome concerns consists of reported cases of miscarriages, spontaneous abortions and fetal deformities among CRT operators at a rate higher than the national norm (about 15%). Though scientifically unsubstantiated, the high rate has as its prime suspect radiation from CRTs.

• Psychological stress: The demands made by an unfamiliar technology, lack of expertise in dealing with the technology and the fast pace of CRT-oriented tasks are just a few of the stress-causing factors cited by users.

• Management practices: Organizations are using technology to track employee productivity; this has added to the level of psychological discomfort and anxiety.

• Miscellaneous: other health-related complaints include headaches, dizziness, colds, fevers, rashes and dry skin.

Visual strain: Foremost among the many factors contributing to this phenomenon is the display itself. Current CRT design reflects two basic approaches; the most popular among vendors is the use of a black background with green phosphorus characters, although amber colored characters are quickly gaining acceptance.

Recently, several vendors have introduced CRTs with white backgrounds and black characters. Both approaches have been found to be easier on the eyes during extended periods of CRT use.

Regardless of the display mode, the glare on the screen and the lighting in the surrounding area could pose problems in focusing the eye. Natural light entering through office windows is perhaps the major source of glare on the screen, and overhead fluorescent lights, reading lamps and shiny reflecting surfaces can add to glare. Most terminals have brightness and contrast adjusting knobs which need to be set to provide the best display for each user.

The number of people who reported visual problems but in fact suffered from undiagnosed preexisting ophthalmological weaknesses — for example, congential cataracts — is unknown. Estimates of uncorrected vision problems in the general population run as high as 30%. Working conditions in automated offices may have simply exacerbated existing problems.

Muscle fatigue: Working with a terminal all day long requires a rigid body posture, which is a contributing factor to users' aching arms, shoulders and backs. Before OA, many workers made frequent moves about the office to retrieve files, file documents or make copies. Automation-induced changes in office work have resulted in a greater degree of postural immobility.

Detachable keyboards and tilt-and-swivel display screens should be encouraged to avoid physical discomfort. In terms of ergonomic violations, chairs have been among the leading culprits. User complaints about backaches and leg cramps can be attributed to orthopedic deficiencies in traditional furniture design. The elements of an individual's working environment in the automated office — the office workstation, the desk on which it is placed, the chair and the ambient lighting — should be designed in tandem. Collectively, they determine the office worker's physical well-being. Related to this configuration is the position of the source document during work at the terminal. The eye can grow tired from the constant refocusing required as the eye glances from the source document to the screen.

The office's physical and architectural environment also needs reexamination. To conserve energy, most of today's high-rise buildings are airtight. Careful consideration should be given to air circulation, heating/cooling and humidity control systems. Several potentially dangerous materials have been used in construction, including insulation materials like urea formaldehyde and absestos. Other chemicals, such as cleaning fluids and chemicals for photocopiers and photocomposition systems, are also used in the office. The accumulation of these substances and dust particles in the air has been suspected to cause Toxic Building Syndrome.

Reproductive abnormalities: The allegations relating to miscarriages and fetal deformities have become major concerns for women operators. Government agencies, such as the National Research Council and the National Institute for Occupational Safety and Health in the U.S. and others in Canada that have conducted studies have concluded that the level of radiation, if any, is below internationally accepted standards of exposure. No evidence has been established between CRT-emitted radiation and reproductive malfunctions in women.

Although no clincal evidence exists, however, the issue should not be dismissed outright. Few studies have examined the problem; none of them have observed a group of workers over a prolonged period of time, using sound scientific methodologies. In addition, tests have been conducted for only certain types of radiations in the electromagnetic spectrum. Multidisciplinary research by medical and organizational scientists, office system designers and CRT users is needed to provide satisfactory answers.

Psychological stress: Automation has been found to be a source of stress because of increased job loads, decreased job involvement, increased job speed, changing job expectations, fear of the new technology and uncertainties regarding high-tech competencies. High tech, initially intended to take over tedious and repetitious tasks, has resulted in some jobs — such as data entry — that become repetitious themselves. Their reduced meaning and content can be a motivational problem. The suggestion has also been made that the collective stress of working in the automated office might lead to behavior changes, both during and after work hours. The need to monitor factors beyond suspected radiation is paramount.

Management practices: An organization must seek out the cooperation of its employees before introducing OA. It is necessary to allay their fears, reduce their anxieties, train them in the use of the new technology and to guarantee, to the greatest extent possible, the security of their work. OA

Thachenkary is an assistant professor in the Department of Decision Sciences, Georgia State University in Atlanta.

Harris is also with the Department of Decision Sciences at Georgia State.

Ergonomic Guidelines for OA

• **Office support systems and CRT terminals:** Provide detachable keyboards, tilt and swivel screens, green or amber character display on screen (most experts now recommend amber), and an adjustable source/document holder. Watch for glare from windows; eliminate glare by choosing a matte finish for keyboards and other system surfaces. Control ambient lighting. A recommended level for offices is 300 Lux. Train users on the correct adjustments of the elements mentioned.

• **Seating:** Provide orthopedically designed swivel chairs equipped with a five-legged star base to avoid tipping (adopted in Europe as the ergonomic standard); adjustable back and seat; and plenty of leg space under the desk.

• **Noise:** Furnish acoustic covers for printers; enclose other noise-generating peripherals in secluded areas. Maintain noise level at 55 to 65 dB(A).

• **Temperature, air quality:** Examine heating, cooling and humidity control and air circulation systems. Periodically test for buildup of dust particles, tobacco smoke and static electricity. Niosh recommends that air should recirculate at least four to five times per hour.

• **Breaks:** Allow regular users of CRTs to take frequent rest breaks. Recommendations range from hourly breaks to alternating between CRT and non-CRT work.

• **Eye care:** Require CRT terminal operators to get periodic eye examinations and to get a medical report before being assigned to CRT work. The employer should bear the cost.

• **Pregnancy:** Pregnant women should be allowed to wear protective lead shields or, if they desire, to be reassigned to non-CRT environments without loss of pay or seniority.

• **Work load:** Examine the work load. Is it geared for the capacity and capability of the user or for that of the workstation? Realign expectations according to human capabilities.

• **Work content:** Examine the content of the work itself. Has it lost any of its challenge and attraction? If so, redesign jobs to provide challenge and variety from the task itself and to maintain motivation.

OA FORUM

By Patricia B. Seybold

In the office systems arena, the transition was gradual. DP vendors with office solutions began to place more emphasis on existing decision support programs (querying facilities and report generators) and to court managers and professionals as end users.

In the professional computing area, however, the transition was explosive. It started with Apple Computer, Inc.computers and Visicorp's VisiCalc, but accelerated dramatically with the advent of the IBM Personal Computer. IBM legitimized the personal computing movement and led to a new level of PC software: professional quality software, characterized by high functionality and ease of use.

When software became available for the IBM PC, the trickle of PCs flowing into managers' offices became a tidal wave. PCs became a vent for the up-to-then unnoticed pressure for individual decision support tools and departmental computing. And, because industry attention shifted to the PC hoopla, most organizations back-burnered plans for the acquisition of office systems.

Among other systems vendors, reactions took several forms. Leading-edge OA vendors were quick to introduce their own, hopefully competitive, PCs, but slow to ramp up production and software availability for those machines. Integrating these standalones into the rest of a systems product line was deferred while vendors focused on competing with IBM. Most systems suppliers initially offered two modes of operation for their PCs: stand-alone operation or on-line terminal emulation. Later implementations headed in the direction of a more closely coupled relationship between the PC and the host office system. Both Digital Equipment Corp. and Data General Corp. finally offered top-of-the-line PCs capable of running the same operating system environment used on their big brother superminis. But so far, such an intimate relationship between an intelligent desktop PC and its host office system has precluded the simultaneous availability of MS-DOS and "native" applications.

At the beginning of the professional computing movement, PC software companies modeled their programs after those found on bigger or dedicated machines. In WP, for example, software houses stopped writing variations on Electric Pencil and Wordstar and began instead to model WP from Wang Laboratories, Inc., NBI, Inc. and Lanier Business Products, Inc. Within a year, office systems developers were procuring and adopting software to mimic the most popular professional computing packages. Spreadsheet and business graphics programs suddenly sprouted on everyone's office systems. PC software first had to come of age, but when it reached its adolescence, the more mature systems designers began to adopt many of its affectations.

The increasing emphasis on managerial tools also breathed new life into minicomputer data base management programs, querying facilities and other decision support tools previously unnoticed by most end-users. Data base facilities have been gradually improving in their usability.

In sum, the PC wave had two results: it attracted non-DP managers and professionals and it tipped the scale in favor of decision support away from administrative support functions as the key benefits for the office user.

Where will the office systems industry go next? In two obvious and fairly unrelated directions. Electronic mail and other forms of information sharing will skyrocket. And, eventually, true end-user computing will emerge.

The first of these two waves is just about to hit us with full force. Our next major challenge is clearly to bind individuals' PCs into some sort of synergistic glue. The second wave — end-user computing — will be quite a bit slower in coming. Interim solutions will come in the form of decision support tools like PC software and data base querying facilities. And, specialized application software (developed in-house or by third-party programmers) will play an increasingly large role for office users.

Over the next few years, office systems installations will be driven by DP requirements. Users will be looking for solutions at the task or the work group level. Those solutions will come in the form of special-purpose software or tailored applications. These will need to be closely coupled with the rest of the tools the group needs to function synergistically: electronic mail, word processing, calendar and phone management and decision support.

It is obviously not a case of mutual exclusivity. The office systems we'll be using over the next 10 years will not all be networked autonomous workstations nor will they consist solely of networked minicomputers (DP or private branch exchange systems) sprouting terminals and PCs; instead, we will see mix and match combinations of the two. Mainframes and other forms of hosts will undoubtedly play an active role as well.

But the focus of integration has shifted. Once we talked about functional integration — how does the WP program integrate with spreadsheet module? Are the meeting scheduler and calendar program tied into electronic mail? Now we are also concerned with architectural integration — How do I tie my PCs to my office system? How do I integrate off-the-shelf PC software that was written by a maverick in a garage last week into the carefully architected office system developed over the last 10 years? OA

In our next column, we will look at some of the issues with which both users and vendors are grappling: architecture, degree of integration, functionality, open-endness and customizability. In examining these issues, we will introduce a framework the Seybold Consulting Group has developed for evaluating integrated office systems. Within that framework is a set of detailed questions we find helpful in analyzing office systems.

If you are interested in obtaining a complete set of questions for your own use in evaluating integrated office systems, they will be available after Nov. 1 by calling our Boston office (617) 742-5200 and asking for the Seybold Integrated Office System Evaluation Workbooks.

Q&A

Craig Brod, psychotherapist and consultant to business and industry, is the author of Technostress: The Human Cost of the Computer Revolution, *which examines how computer technology affects users' psyches. He talked with* Computerworld OA *about technostress in the office.*

What is technostress?

Technostress is the inability to adapt to computers. It's characterized by underadaptation, when somebody feels overwhelmed and frightened by the equipment, and overidentification, when people involved with computers get so overinvolved they simply don't stop working when they're tired. They begin to pattern their thinking after the machine itself.

You mention "technoanxious" and "technocentered" people in your book. Is one easier to deal with than the other?

People who are overwhelmed by the technology are technoanxious. They say, "I can't sleep. I go home and I'm grouchy." Technocentered people say, "I've got this wonderful machine; to hell with people. I just want to be left alone with my machine all day and allowed to process symbols."

Technoanxiety is easier to deal with because it's a transition, a passing phase. Helping the technocentered person is much more difficult; you're talking about a lifetime relationship with that machine. If the computer does change socialization patterns or reinforce poor socialization patterns, it becomes difficult for these people to relate to others.

How common are these problems?

People who are technoanxious — frightened by the equipment — are most common because the office is currently going through the greatest change with the influx of word processsing and personal computers. But I'm also seeing overidentification in the office. The computer used to be a small part of a firm, relegated to the back room and we had the image of the computer "nerd." That's a less important image now; the image is more and more that of an office worker using the technology and being tired by it.

You warn of the tendency to internalize computer qualities, which can make us feel inferior. How can we get around this?

It's a shame the computer industry has, in a sense, played machines against people. They present the machine as perfect. With the push for increased productivity, performance, entrepreneurial spirit and the rest, we do identify with these machines. Managers and employees both need to learn how to draw limits and discuss what's happening when they notice themselves experiencing mental fatigue.

Workers need not draw the comparison between themselves and the machine. The computer can go on and pace itself until it short circuits; it doesn't work like a brain. We need to realize that a human being can intuit things extremely quickly, can perceive problems coming down the line days in advance. A machine can never do that. We should pride ourselves on what's uniquely human and compare ourselves less with machines.

You see the technostressed person communicating without any emotion, using the computer as a model. How do you change that?

All day long, people are reinforced for dumping, processing and exchanging information. Then they're told to go home and be human. There are some practical things people can do. They can take a half-hour break before going home. They can do something with a different sense experience when they get home, — maybe gardening or playing with clay. Running is ok, but not in a performance sense — don't try to beat the clock.

And don't go home and hook back into your computer.

(Continued on Page 6)

Q&A

(Continued from Page 5)

During the industrial revolution, workers suffered from poor working conditions. Are we seeing a similar phenomenon?

In fact, the tremendous control over employees in many offices is very much the same as that on the assembly line. We are seeing a situation in which the technology has been revolutionized, but the thinking that has gone into how to manage, how to work and how to relate to people has not been revolutionized at all.

Instead of counting the number of bolts a worker tightened in an hour during the industrial revolution, studies now under way are trying to find out how many documents professionals can produce or how much information they can handle.

How can this sort of thinking be changed?

It's going to be a long process. We need to help managers to think in terms of different measurements of productivity. Most are driven by bottom-line results, and they need to view their work differently.

In a lot of situations, individual employees don't have any idea of how they are hooked into the whole. They just know they are typing symbols onto a screen then the symbols are swallowed up. We need more teamwork, we need to have people understand the whole.

We also need managers to understand what it's like to be on that machine. I sometimes tell managers to try processing symbols for 20 minutes. It doesn't take more than 10 minutes before they say, "God, this is terrible work."

How do businesses receive the strategies you suggest?

First, business has to perceive that there is something "wrong" with putting somebody at a terminal for eight hours and telling him to type. A great percentage of managers can't see that. It's going to be a while before it's perceived that a machine should be used for more than just processing documents.

Managers have not recognized the problem any more than managers in the industrial era saw a problem with having workers stand all day putting one part on a machine.

Except for a small percentage, these managers will continue to manage as they do until they start to lose their businesses or until they're forced to manage differently.

What is your scenario for the future of this influx of technology?

I'd like to say this is only the first part of a transitional period. I'd like to say people are going to put all these machines in place, be kind to their workers and be more decent to each other, but that's just optimism.

There are some progressive experiments, called "democratic automation," in which people are involved in selecting their machines and experimenting with ways of working together, and where secretaries are able to do more interesting work and control their time more.

That's a viable direction, but these experiments are very small pilot programs. Most companies clamp them off because they don't want them to spread. OA

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OA NEWS

BIG BLUE MARCHES ON

The major computer vendors have discovered that when IBM makes up its mind to move, there is little they can do to stop it.

In August, IBM unveiled its long-awaited "Popcorn," the PC AT (Advanced Technology) along with an office network, a windowing software program for the Personal Computer and a variety of options and enhancements for its office product line. Industry analysts are expecting more major announcements from IBM this month concerning office systems, and the flurry of activity has increased the already intense pressure on the rest of office computer makers.

The PC AT marks IBM's entry into the multiuser, multitasking workstation market at a price/performance level that left analysts impressed. Available in two configurations, the PC AT is based on the high-speed Intel Corp. 80286 microprocessor and comes with a 1.2M-byte high-capacity diskette drive and expanded fixed-disk drive options. Starting at $3,995 (for the PC AT 256K bytes of random-access memory [RAM]), the workstation can be shared by up to three users and reportedly delivers almost five times the user memory (up to more than 3M bytes of RAM) and twice the storage capacity of the Personal Computer.

At the same time, IBM announced version 3.0 of PC-DOS and IBM PC Xenix — Microsoft Corp.'s version of Unix — to give the multitasking capabilities to the AT. IBM's entry into the multiuser market was not good news for either traditional minicomputer makers or the dozens of start-up companies targeted at that market. IBM's choice of Xenix instead of AT&T's System V Unix is a severe blow to the latter's quest for making System V an industry standard.

According to Amy Wohl, a consultant in Bala Cynwyd, Pa., the PC AT is not a breakthrough product, but just the next natural step in the company's generation of workstations.

"The PC AT is more powerful and faster than the PC XT and it's aggressively priced," Wohl explained. "It is going to make it a lot harder for people who sell IBM-like products to compete. And it enhances the argument that IBM will offer everything — a complete family of products that nobody else has."

In addition to Topview, a windowing software program priced at $149, IBM announced the IBM PC Network, a local-area network option developed by Sytek, Inc., which reportedly allows users to tie together up to 72 IBM Personal Computers in a network configuration. The company, acknowledging this as an interim solution, stated its intent to provide connectability to its future token-ring local-area network due in two years.

The PC Network marks the first time IBM has offered an office automation product that revolves around its Personal Computers, Wohl said. "It's a gutsy, aggressive IBM stepping up to the line saying, 'We really don't have the product we want to announce yet, but here's a really terrific interim solution which is more than you can use anyway.' "

This willingness on IBM's part to offer alternative local-area network solutions could mean trouble, analysts said, for competing office vendors such as Xerox Corp., Wang Laboratories, Inc. and even AT&T. And while the competition ponders this predicament, another Big Blue storm is already brewing. Analysts predicted that IBM would be announcing the positioning of its System 36 minicomputer as a cluster controller for its office automation push. The interconnection between Personal Computers and the System 36, along with the availability of the PC Network, will give IBM blanket coverage for both large and small office configurations.

"It will make IBM that much harder to position against," one consultant said.

CAROLINA COURT CASE

CHARLOTTE, N.C. — In April, 1981, Curtis A. Barksdale, Laura Harvey, Judith Kastanis and Dorothy Potts, all residents of the Charlotte area, were hired through a temporary agency to work at IBM's Charlotte Human Factors Center. Though each worked at the Center for less than a month, the short interaction has resulted in a $7.6 million lawsuit by the four against IBM in federal district court.

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infliction of mental distress and invasion of privacy, the plaintiffs have claimed that they were unknowingly used as guinea pigs for IBM product testing which resulted in their suffering continued mental and physical distress.

"It was, in fact, the specific intention of IBM to cause severe emotional distress and make a record of it," the plaintiffs claimed in the official complaint.

IBM has denied the charges, saying they "have no basis in fact and are totally without foundation. The suit itself is frivolous."

According to the complaint, the four plaintiffs were solicited by Corporate Personnel Consultants & Temporaries, Inc. of Charlotte to work at "an ordinary keypunch job," or "a normal data entry job." "At no time was the job described as a test of human tolerance, human reactions or psychological testing of any nature. Further, no representation was made of any possibility of damage resulting from said job."

After they reported to work on or about April 17, the plaintiffs' claim, John Caskarini, their supervisor, "began manipulating the machinery and other environmental factors in order to induce stress and other results." Caskarini reportedly varied the angles of the machines without warning, changed the lighting from bright to dim, altered screen size and "goaded and exhorted" them to a frantic pace of work.

As a result, the plaintiffs claim to have experienced "pounding, continuous headaches, gripping pains in the chest area, loss of equilibrium (often falling), frequent nausea and unusual eating habits, loss of memory, depression, nervousness, pain around the eyes, insomnia, fainting and blackouts, hallucinations, problems with focusing, inability to watch T.V. and extreme weakness."

Although they were reportedly urged to finish the assignment, none of the four did. Upon leaving, they took an eye test given by IBM's Dr. Schwartzenegger who, they claim, told them their vision had been damaged.

It was only at the time of the eye examination that the plaintiffs "realized they had been used in an experiment without their knowledge and to their detriment."

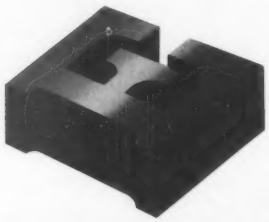
While it remains in litigation, IBM refused to discuss the specific case, but a spokesperson pointed out that IBM has 20 such human factors testing facilities worldwide and that each uses only approved methodology.

"We are completely open with our test subjects. We tell them beforehand exactly what we are doing, and we don't test for stress," the spokesperson insisted. "We are looking for the optimal interaction between user and machine, and we want to develop the best possible products. The standard operating procedure is to be open and honest with all people and discuss all relevant details of the testing."

The spokesperson also pointed out that IBM regularly uses both temporary and full-time employees in its testing.

The case, which was originally filed in Mecklenburg Superior Court in May, was moved to the federal district court in Charlotte in August.

According to the court clerk, a case like this could take at least a year to settle.



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OA NEWS

COMPUTER USERS SPEAK OUT

BELLEVUE, Wash. — Hewlett-Packard Co. was the top choice and IBM managed only a fourth-place finish in a recent survey of how computer users viewed the vendors. Compiled by Stuart Kirkland, a Bellevue, Wash., research firm, the survey of more than 3,000 users focused on 12 major computer manufacturers. Respondents were asked their opinions relating to computer hardware, service, software and overall satisfaction with the company.

Following HP in the top four were Amdahl Corp. and Digital Equipment Corp. Though IBM was ranked first in reliability of hardware and effectiveness of repair (in the service category), it failed to take first place in any of the composite categories. Based on both reliability and ease of use, Amdahl took the top spot in the composite hardware category, followed by HP, Wang Laboratories, Inc., DEC and IBM.

In the service category, HP was the composite winner, ranking first in parts availability, second in response time and effectiveness of repair. IBM was second overall, followed by Amdahl and DEC. Burroughs Corp., Prime Computer, Inc. and Wang brought up the rear in the service category with weak showings in all three subcategories.

Under the software heading, DEC took first place overall with strong ratings in all seven software subcategories, including systems software and operating system; utilities; applications programs; ease of use; documentation; software service and support; and overall quality of software. DEC scored a 72.5 out of a possible 77 rating, more than 13 points higher than second place HP. Control Data Corp., Prime and Sperry Corp. finished at the bottom in software.

In the final category, the manufacturer as a company to do business with, Amdahl, IBM and HP took the top three spots, with Data General Corp. finishing last. Prime and Wang also scored poorly in this category.

The survey also focused on user satisfaction with both word processors and microcomputers. In word processing, NBI, Inc. scored a perfect 100 performance rating index, followed by CPT Corp., IBM and Wang. Kaypro Corp. and North Star Computers, Inc. finished first and second in the micro category, but with limited respondents — 10 and 9 respectively — using the machines. The survey pointed out that user satisfaction had virtually no correlation to the share of market in both the word processor and micro categories.

Although most vendors scored either consistently high or low, Wang showed the most noticeable swing in user perception. According to the report, "Wang users like its speed and its ease of use. They do not like its cost, its printers, or its hardware service."

The survey is available for $125 from Stuart Kirkland, No. 117, 10636 Main St., Bellevue, Wash. 98004.

OA AND THE ELECTION

WASHINGTON, D.C. — With the presidential election less than a month away, Republicans and Democrats have pulled out all the stops. While Mondale and Ferraro and Reagan and Bush are out on the stump, pressing the flesh and kissing babies, the behind-the-scenes computers are whirring nonstop.

At Mondale/Ferraro National Campaign headquarters in Washington, Bill Combs, deputy director of administration, is in command of the data processing and office automation functions. Though there was an early influx of Kaypro Corp.'s Kaypro portables, Compaq Computer Corp. Compaqs and IBM Personal Computers during the campaign, the committee made a heavy commitment to Digital Equipment Corp. in July. As Combs pointed out, there had been a network of IBM PCs set up in March to handle delegate tracking for the July convention. That network "worked like a charm" and its success convinced campaign leaders that more computer power was necessary.

In July, the Mondale committee leased a DEC VAX 11/750 along with 30 VT 100 terminals, 25 Decmate II WP workstations and a Rainbow personal computer for each of the state campaign headquarters. All of the computing strategy is coordinated through the national campaign office in Washington.

Beyond delegate tracking, the Democrats' system is being used extensively for WP, document transfer, budgeting, forecasting, communications and data base management. Despite its many uses, Combs said, he feels that "in computer terms, what we have is very simplistic. We started getting things together very late, and there was no time or money for sophisticated applications. Everybody realizes that we haven't gotten as far as the Republicans."

The bread and butter, Combs said, is the communications capability, which "saves a lot of time. We can draft a speech and feed it to the [candidate's] plane for immediate revision. Plus, once you have the capability, many users can access that information."

Unlike the Democrats' setup, the Reagan/Bush reelection campaign has turned toward the Republican National Committee (RNC) to help coordinate its computer activities. Thomas B. Hofeller is director of computer services for the RNC and he pointed out that the campaign committee has no specific OA strategy, simply because of the lack of time. "The organization develops quickly and then collapses when the election is over. They tend to bring in equipment they are familiar with," Hofeller said.

Besides contracting out such functions as direct mail, the

(Continued on Page 63)

BRIEFS

CUPERTINO, Calif. — The competition among IBM, Apple Computer, Inc. and AT&T in the micro market will force the development of a new form of VM operating system, according to a report by Strategic, Inc. The system will run IBM PC-DOS, AT&T Unix and Apple Macintosh applications, eliminating software availability as a major purchasing concern. The report, "IBM, Apple, AT&T: Impact on the Microcomputer Software Industry," costs $1,500 from Strategic, Inc., 10121 Miller Ave., P.O. Box 2150, Cupertino, Calif. 95015.

RESTON, Va. — The dearth of training programs for managers is one reason for the limited impact micros have had in U.S. corporations, according to a survey by the accounting and consulting firm of Arthur Young.

Nearly 60% of the 453 companies surveyed reported little or no use of micros. Only 25% of the companies reported formal training programs for employees. The survey, which is not for sale, concluded that many companies rely too heavily on self-driven tutorials. For more information, contact David Wilson, Arthur Young Bldg., 1950 Roland Clarke Place, Reston, Va. 22091-1490.

LOWELL, Mass. — Wang Laboratories, Inc., and Rolm Corp. have agreed to work together to make Wang OA products compatible with the Rolm CBX II business communications system. The firms will test equipment to confirm interconnectivity and define and test methods of compatibility.

Wang also announced a nonexclusive agreement with Mitel Corp. to connect Wang computers through the Mitel SX-2000 family of digital PBXs. For more information, contact Wang, One Industrial Ave., Lowell, Mass. 01851.

CLEVELAND, Ohio — The U.S. market for data base management systems exploded between 1972 and 1983, growing 34% from $25 million to $625 million, according to a report by Predicasts, Inc. The firm predicts that DBMS sales will grow to $5 billion by 1995.

"U.S. Database Management Systems & Equipment Markets" points to the rapid emergence of relational DBMS, increased emphasis on integration, distributed DP and "firmware." It costs $1,400 from Predicasts, Inc., 11001 Cedar Ave., Cleveland, Ohio 44106.

NORWALK, Conn. — Large vendors such as AT&T and IBM are not likely to drive small companies out of the public access videotex market in the near future, according to a study in International Resource Development, Inc.'s (IRD) bimonthly videotex journal, *Videoprint*. The report said that while Digital Equipment Corp., IBM, Wang Laboratories, Inc. and AT&T are threatening to gobble up the corporate videotex market, the public access market consists of a handful of companies exploiting market niches too fragmented for the giants. A free copy of the July 23 issue is available from IRD, 6 Prowitt St., Norwalk, Conn. 06855.

NEW YORK — Microcomputers are gaining wide acceptance, especially in companies with more than 5,000 employees, but the process of integrating micros into intraorganizational systems is barely under way in most firms, according to a *Newsweek* market research report based on a survey of 1,339 members of the Association of Information Systems Professionals (Aisp).

"The Impact of the Microcomputer in the Business Environment," said 90% of the companies responding are using micros or are seriously considering purchasing them. The report costs $25 from Advertising Resource Center, *Newsweek*, 444 Madison Ave., New York, N.Y. 10022.

TACOMA, Wash. — "Equal Access," a report offering analysis and recommendations for exchange and interexchange carriers, was released by the Ernst & Whinney Telecommunications Group.

The report, published in the July issue of *Action Guide 1984-1985: Managing Access Charges*, deals with economic

(Continued on Page 63)

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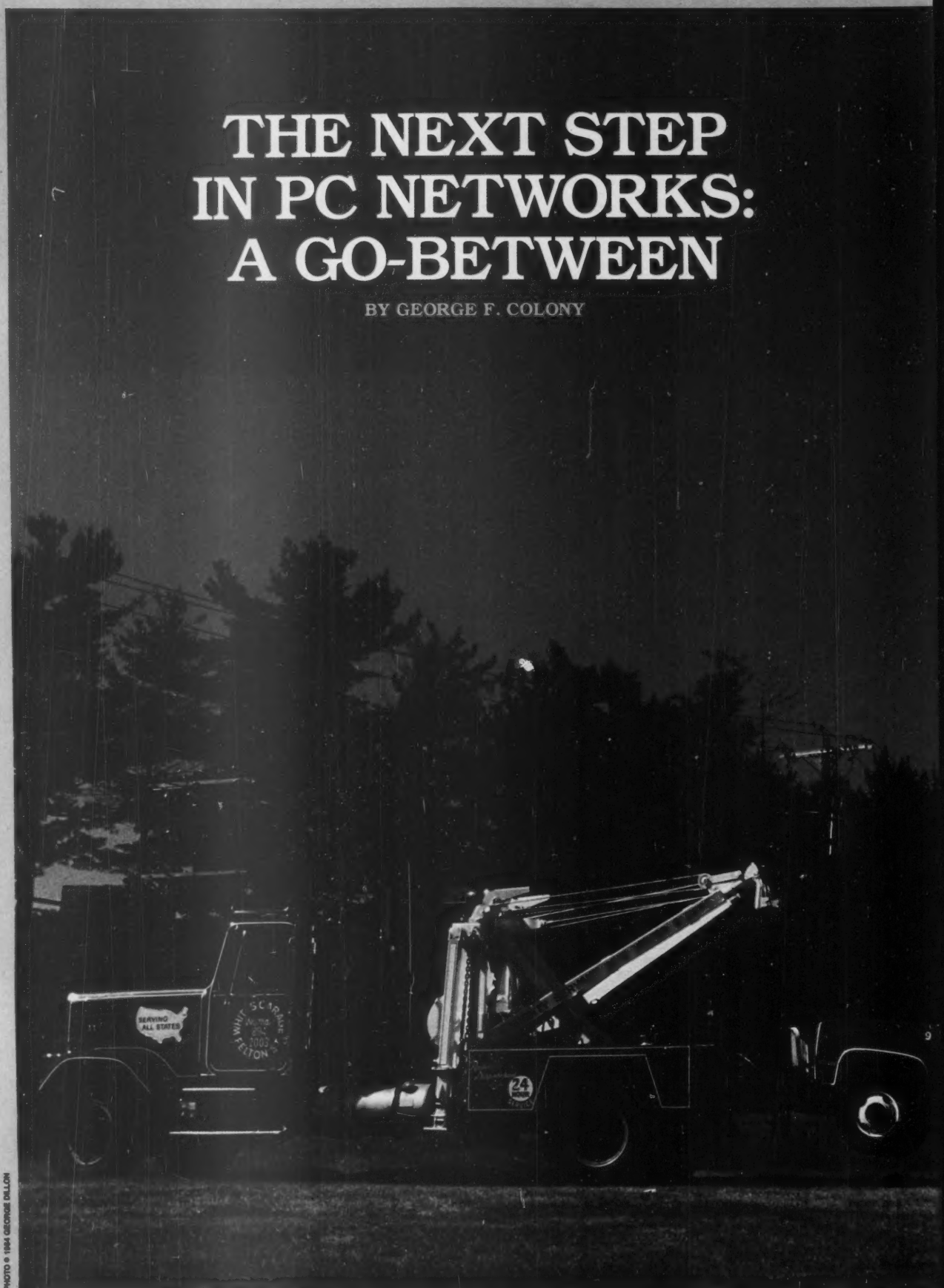
THE NEXT STEP IN PC NETWORKS: A GO-BETWEEN

BY GEORGE F. COLONY



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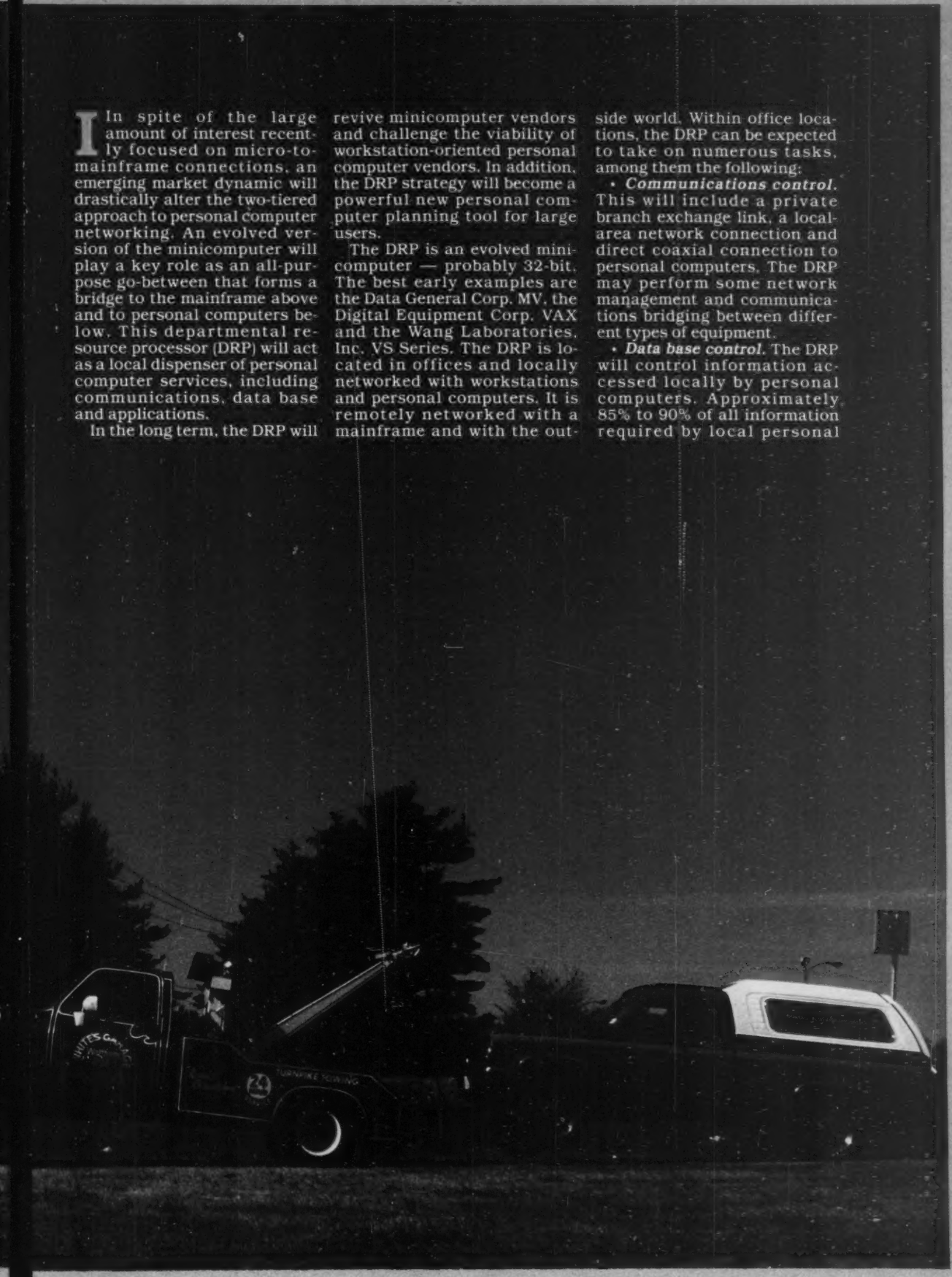
In spite of the large amount of interest recently focused on micro-to-mainframe connections, an emerging market dynamic will drastically alter the two-tiered approach to personal computer networking. An evolved version of the minicomputer will play a key role as an all-purpose go-between that forms a bridge to the mainframe above and to personal computers below. This departmental resource processor (DRP) will act as a local dispenser of personal computer services, including communications, data base and applications.

In the long term, the DRP will revive minicomputer vendors and challenge the viability of workstation-oriented personal computer vendors. In addition, the DRP strategy will become a powerful new personal computer planning tool for large users.

The DRP is an evolved minicomputer — probably 32-bit. The best early examples are the Data General Corp. MV, the Digital Equipment Corp. VAX and the Wang Laboratories, Inc. VS Series. The DRP is located in offices and locally networked with workstations and personal computers. It is remotely networked with a mainframe and with the outside world. Within office locations, the DRP can be expected to take on numerous tasks, among them the following:

- ***Communications control.*** This will include a private branch exchange link, a local-area network connection and direct coaxial connection to personal computers. The DRP may perform some network management and communications bridging between different types of equipment.
- ***Data base control.*** The DRP will control information accessed locally by personal computers. Approximately 85% to 90% of all information required by local personal



computer users will be found at the DRP, which will also act as a personal computer memory back-up facility.

• ***Applications control.*** The departmental processor will stand as an applications engine. Software programs for micros will be distributed to workstations from the DRP, which will also become the center for local applications development. In addition to its local communications functions, the DRP will link to other locations. Its interoffice communications roles include:

• ***Accessing the corporate data base.*** If information requested by personal computer users is not contained locally, the DRP must enter into a high-level session with the mainframe data base. This implies a distributed data base that would span DRPs and mainframe.

• ***High-level communications.*** The DRP must talk to the mainframe with high-level compatibility. In 75% of the Fortune 1000 companies, this means the DRP will have to bridge into IBM's Systems Network Architecture (SNA) network. Note that this is not just Systems Data Link Control compatibility, but full linking with all levels of SNA — including application (data base).

• ***Other networking.*** In addition to mainframe communications, the DRP must bridge to other DRPs within the company; public networks (for example, Dow Jones); and any resource a personal computer user wants to access in the outside world.

The DRP concept implies a high level of compatibility between the DRP and the personal computer and a high level of compatibility between the DRP and mainframe resources.

If the DRP is a non-IBM unit, then this third-party machine must have excellent links to SNA and other IBM resources.

The essence of the DRP is creating harmony among personal computer, minicomputer and, ultimately, the mainframe. This may mean that a one vendor environment is required — a user who chooses Wang for its DRPs, for example, will naturally migrate to the Wang workstation solution.

Some barriers exist to DRP implementation. The departmental resource processor has been slow to emerge. Although many Fortune 1000 users believe in the DRP concept, they cannot, in 1984, create a coherent micro-to-mainframe network using a minicomputer. Several reasons account for this slow development. Information processing vendors (minicomputer, mainframe and personal computer companies) are not positioned to offer solutions. Corporate management information systems is not presently organized to implement the DRP.

The technology to deploy compatible communications across different architectures is presently unattainable. Admittedly, the DRP concept is somewhat futuristic. Several technology problems stand in the way of deployment on the scale described above. Distributed data bases do not exist. Little compatibility exists between minicomputers and personal computers. Applications software is sold on a micro-by-micro basis. Licensing does not permit shared packages.

Despite present DRP barriers, however, other factors dictate Fortune 1000 movement to intermediate processors, such as:

☐ The prohibitively high cost of micro-to-mainframe communications — especially if the mainframe is located at a remote site.

☐ The requirement for community information sharing — it has been estimated that between 65% to 75% of all business communications are within a building.

☐ Requirement of personal computer users to bridge into many different types of networks. This bridging is more efficiently shared than dedicated to each workstation.

☐ The need for backup of auxiliary memory from personal computers and easy sharing of applications software.

☐ The ability it provides companies to base personal computer planning around a coherent, growable design.

Companies best positioned to take advantage of the growing market for DRPs will be minicomputer vendors with a general business systems approach — those not oriented to niche markets such as scientific and engineering. The companies with the best prospects have the following characteristics:

• An installed base of minicomputers on which to grow the DRP concept.

• Data base facilities.

• A mature systems network protocol with facilities for IBM bridging.

• A profile in the personal computer market.

• A direct sales force oriented toward end-user computing (office automation).

• Applications software for interface to data base, communications, word processing, calendaring and so on.

These requirements shut out companies like Stratus Computer, Inc., Pyramid Technology Corp. and Apollo Computer, Inc., which are newcomers to the minicomputer market and minicomputer vendors like Prime Computer, Inc. and Tandem Computers, Inc., which are oriented to niche markets such as non-stop computing, laboratory systems, or factory automation. Also excluded are OEM vendors — (Perkin-Elmer Corp. and (Gould, Inc.) and companies that are not in the minicomputer business (Apple Computer, Inc., Tandy Corp., Exxon Office Systems Co. and Lanier Business Products, Inc.).

The vendors best able to exploit and leverage their DRP positioning are IBM, Wang, DEC, DG, Hewlett-Packard Co. and AT&T Information Systems.

The DRP will alter the present personal computer and office systems rules. The new parameters include the following:

☐ Advantages to the smart minicomputer vendors that move to expand the mini out of the old OEM, science/engineering role and into a commercial, OA, personal computer role. Early smart vendors are DG presently winning three out of four OA Fortune 1000 contracts against IBM) and Wang Laboratories. Although these two companies are certainly not dominating the micro market, their mini/micro positioning will ensure expanded growth in the Fortune 1000.

☐ New organizational pressures within DEC and HP to squeeze micro and mini development and sales closer together.

☐ Shakeout in the personal computer computer industry — moving the business away from stand-alone solutions and toward systems. The personal computer companies that move to multiuser systems first will have the best shot at making the transition to a DRP factored market.

☐ Pressure on IBM to standardize on one minicomputer direction. Highly placed IBM sources have now said that the S/36 will "... absolutely, positively" be the machine the company pushes as its departmental/personal computer solution. IBM has scheduled announcements for this month to move the S/36 closer to the Personal Computer.

☐ Pressure on IBM to shed old resource processor solutions — for example, the 8100, 5520, S/34 and S/38. These solutions will continue to be supported, but not with the power of the S/36.

☐ A second shot at the micro market for non-IBM mainframe vendors with minicomputer positioning — specifically NCR Corp., Sperry Corp. and Honeywell, Inc.

☐ The creation of new opportunities for personal computer software vendors. With the advent of the DRP, a new class of shared, multiuser software will be required. As an example, Lotus Development Corp.'s 1-2-3 will have to be linked to a DRP data base and be loaded from the DRP into many different micros.

☐ The micro-to-mainframe communications vendors will be stalled. Cullinet Software, Inc., Mathmatica Products Group, Inc., Computer Associates International, Inc. and On-Line Software International, Inc. will have to embrace DRP solutions. The best path for these players may well be a joint venture with a DRP vendor.

‡ OA

Colony is president of Forrester Research, Inc., a consulting company based in Cambridge, Mass.

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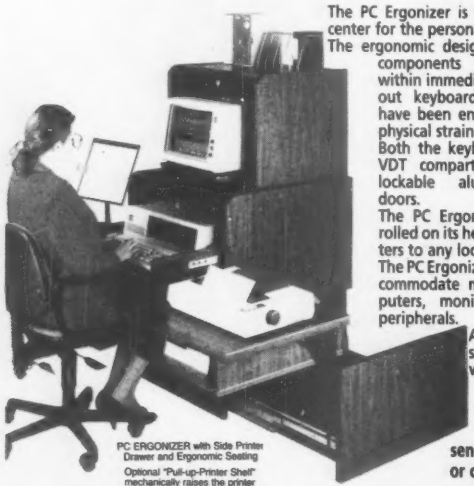

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THE IMPACT OF OA

BY DONNA TARBANIA

Office automation is undergoing four important shifts that will have a significant long-term effect on workers, jobs and organizations.

The Diebold Automated Office Program, in an attempt to assess the status of OA in large (Fortune 500) organizations, recently surveyed 84 management information systems/office automation directors in the U.S. and Canada. The data from that survey indicate that the scope and significance of OA are undergoing the following changes:

- Previously, OA concentrated on office support staff; the focus has now moved to business professionals.
- Top management support stems less from a desire to control costs and more from an appreciation of the contribution technology can make to personal and organizational effectiveness.
- The term "office automation" is being engulfed by the broader "end-user computing."

Access to terminals and workstations is expected to increase between the end of 1983 and the end of 1985 from 30% to 54% of the white-collar work force in the organizations sampled. These figures are qualified by our definition of access; the data reflect both shared and individual access to terminals and workstations. The difference between the two is potentially significant; knowledge of access does not allow inferences about amount of use or the quantity of equipment.

Nevertheless, the levels of anticipated growth indicate that organizations are willing to make large investments in office technology — a significant departure from past practice. In 1979, the average

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per capita capital investment for white-collar workers was $2,000. According to projected deployment of equipment networks and features, this figure is rising sharply.

Information work and the office environment have become highly visible in organizational drives to improve productivity and competitive position.

Figure 1 on Page 17 provides more detailed data for white-collar workers in each of four categories: support staff, professionals, managers and executives.

Support staff: The clerical/secretarial group is the category that currently has the largest proportion of workers with individual or shared use of a terminal or workstation.

Companies surveyed said they would continue to equip support staff; 43%, or nearly half of the respondents, anticipated that more than three-fourths of their support staff would have use of equipment by 1985. Of every 10 companies surveyed, only one expected low deployment.

By the end of 1985, more than half of all the support staff employed by these companies will have access to terminals or workstations. If the anticipated growth rate is sustained over the next two years, decisions on clerical and secretarial support in large organizations will have more to do with the enhancement or replacement of terminals and workstations than with their initial purchase.

Professionals: Professional workers account for the largest share — approximately 43% — of the white-collar work force in the 84 organizations reporting. The percentage of companies reporting low levels of deployment for professionals followed a trend similar to that shown for the clericals. From a ratio of one in two in 1983, the number of firms reporting low levels of deployment drops by two-thirds to become only one in six by 1985.

Over the same time period, the percentage of companies reporting high availability of terminals among professionals triples.

Nearly two-thirds of the organizations sampled said they expect the majority of their professional workers to have access — either shared or individual — to a workstation or terminal by the end of 1985.

Managers: As a group, managerial workers have relatively few terminals or workstations at their disposal.

Four out of five (80%) responding companies reported fewer than one-quarter of their managers had personal or shared use of a terminal or workstation.

Within two years, however, such companies will be in the minority as OA tools steadily penetrate managerial ranks. The number of companies reporting the highest levels of access (over 75%) will quadruple by 1985 and will then account for nearly one-fifth of the sample.

Executives: The pattern of deployment of terminals and workstations among executives is similar, though not identical, to that of managers. Again, a large majority (87%) of companies report low levels of equipment among executive workers.

Across all four worker categories, a convenient dividing line for staff access to a terminal or workstation was "less than one-quarter." However, at the executive level, less than 10% of the staff had access to a terminal or workstation at two-thirds of the responding companies.

Figure 1 suggests that organizations will be concentrating more on providing OA facilities for executives, although somewhat behind the pace suggested by the data on managers. Because these executives account for only a small proportion of the white-collar work

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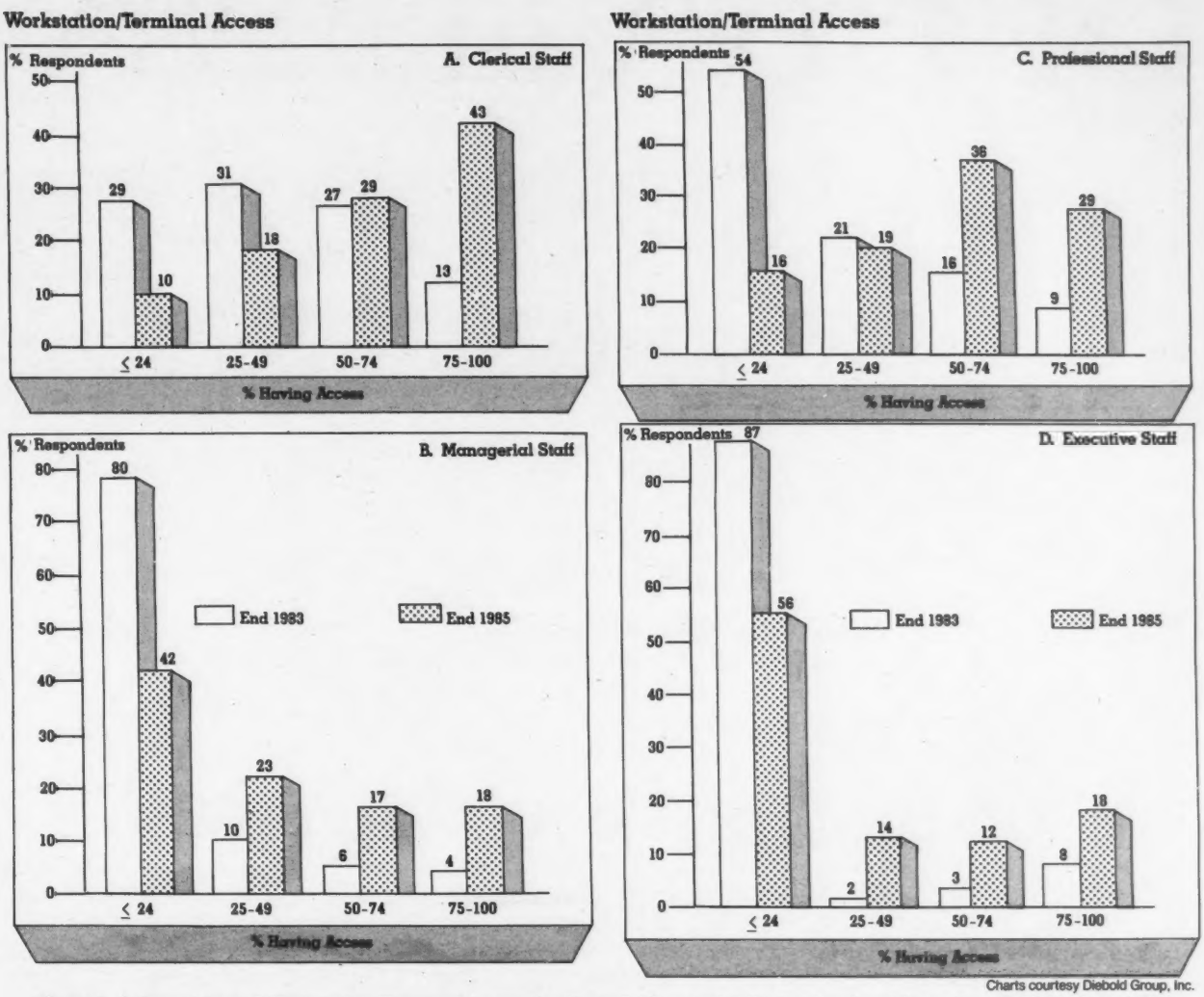

Charts courtesy Diebold Group, Inc.

Figure 1. A Comparison of Workstation/Terminal Access for Clerical, Managerial, Professional and Executive Staff (1983 vs. 1985)

force, this trend does not represent a large monetary investment. However, because of the visibility and decision-making authority of the executive function, those OA applications are critical to the future course of OA in the organization.

Projected growth in deployment of terminals and workstations can be visualized as a series of curves. The curve for support staff is the most developed and will be the first to peak. The professional curve is quite close behind that of support staff; it is also building more rapidly and is likely to top out at a higher level. Curves for managers and executives are somewhat further behind and look quite similar. They currently reflect a rapid rate of growth that cannot be expected to level off in the short term.

The traditional emphasis of OA on clericals and secretaries is giving way to one on professionals and technical workers. Data indicates that, although most workstations and terminals now in use are in the hands of clericals and secretaries, by 1985 that distinction will belong to the professional and technical work force.

This will be true not only because these workers account for a large share of the white-collar work force, but also because of recognition that improvements in their efficiency and effectiveness can have a significant impact on business performance.

Our evidence indicates that the impact of office technology on professional workers thus far is perceived to be overwhelmingly positive — more positive, in fact, than in any other worker category. Although OA and management information systems (MIS) professionals may be predisposed to see positive outcomes of OA efforts, the data are nevertheless impressive.

According to 95% of respondents, office automation has raised both the quality and the amount of information professionals receive. Improved availability and timeliness of vital information necessarily contribute to improving the content of reports, analyses and other professional work products. The quantity of work output and the effectiveness of time utilization have also increased, as respondents indicated four to one.

Professional performance is also believed to be greatly improved as a result of office technologies. Three-fourths of the respondents believe job satisfaction is also greater among professionals, even though productivity studies have demonstrated that no correlation exists between productivity and job satisfaction. Today's office technologies support nearly every facet of the information-seeking, information-use and information-dissemination tasks required in professional work.

Information seeking is made easier by on-line access to corporate data bases and to data resources outside the corporation. Such tools reduce the time professionals spend duplicating work because they don't know about or can't find earlier data or solutions.

Professionals now use the personal computer more widely than do any other workers; it will be even more widespread among them by 1985. A comparison of professional work and the capabilities of micros demonstrates their complementary nature.

Manipulation and presentation of document-based information are the primary tasks carried out by 4,000 professional and technical workers, according to a Diebold profile. The professional's typical work product consists of numeric, textual and/or graphic representation of information. Microcomputers clearly have a great deal to offer in such an environment. They can enhance both mechanical and conceptual aspects of the work process. The text processing, spreadsheet, modeling and graphics capabilities available on single machines and, to an increasing extent, in single pieces of

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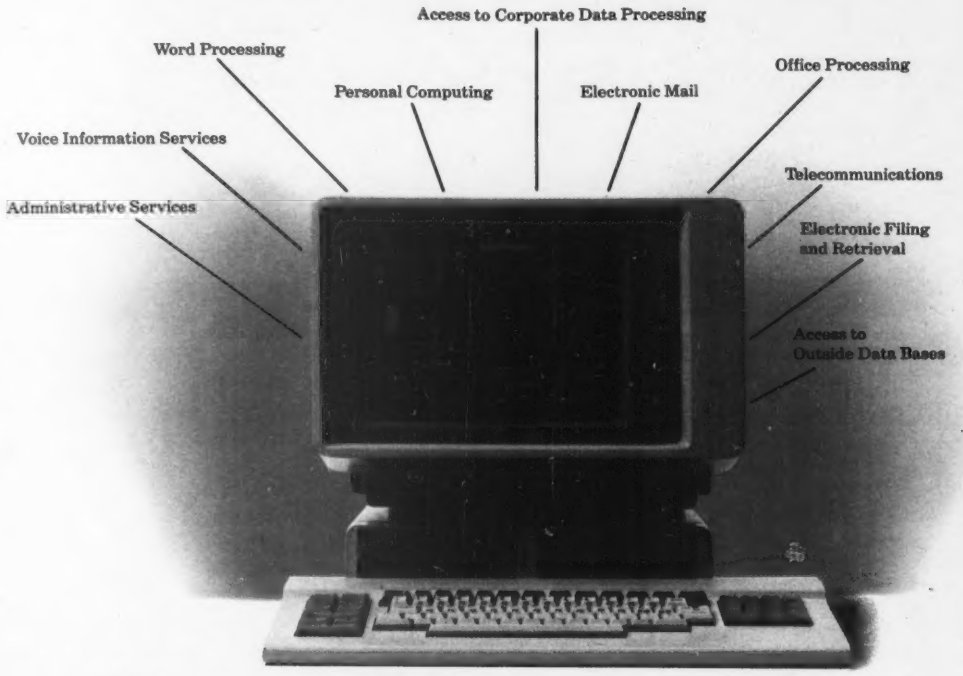

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software, improve efficiency and add value. They allow complex analyses to be performed in less time and with greater accuracy. The time and cost barriers to work refinement are also removed.

Dissemination of information among professionals is facilitated by text-based communications systems. The use of these systems for document distribution and information sharing has several results, among them savings in telephone and telex charges and collaboration fostered among workers at different sites by means of fast turnaround. More than half (58%) of the survey respondents said professional collaboration in their organizations had increased. Despite these favorable reports, two important qualifications must be considered:

- Although office technologies make the flow of information faster and more convenient, they also transmit greater quantities of information that is not productive.
- Technology may help workers to manage work loads better and, therefore, may improve productivity. Less predictable, but potentially greater, are the benefits to those who find ways to use the technology to extend and enhance thought processes.

Although rapid deployment of equipment lays the groundwork necessary for achieving significant benefits, it is insufficient by itself. Workers and organizations must be more aware of the costs and benefits of information they acquire, process and transmit.

Organizations should also examine their attitudes toward workers' use of office technology. Data and financial resources must, of course, be protected. Nevertheless, enabling rather than restrictive policies will increase the chances that workers will themselves find ways of using technology to augment their work.

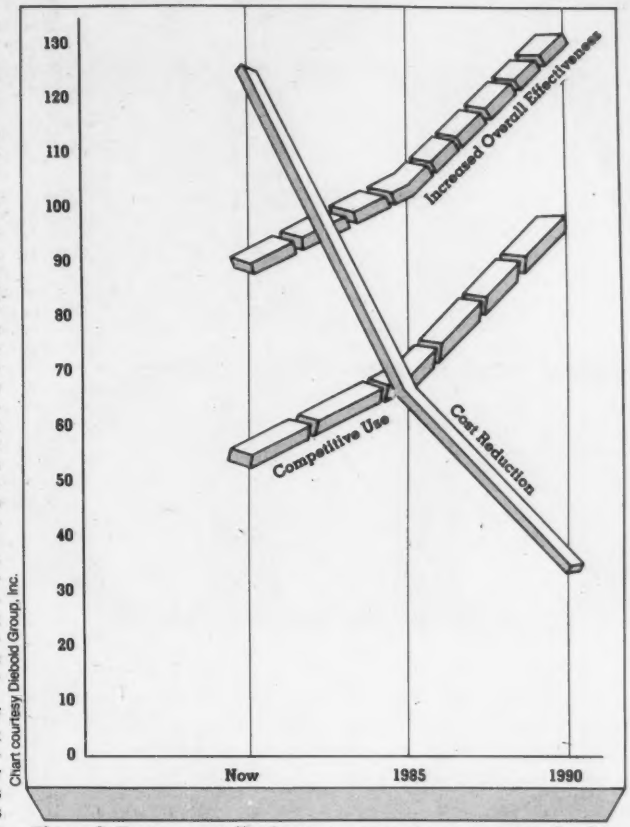

Figure 2. Factors contributing to top management support for OA.

Single-function workstations in offices are on the wane. Organizations seeking to provide technological support to the full range of office tasks and workers find the multifunctional workstation more desirable. Clerical and secretarial workstations, formerly restricted to WP, are a good example. Although not expected to have the full capabilities provided to managers and professionals, these workstations are increasingly likely to require electronic mail, calendar and access to local corporate data bases. Multiple functions complicate the already demanding tasks of designing, building and managing an organizationwide system.

The professional and managerial workstation is also evolving, as can be seen in the applications profiles provided by survey respondents. Over three-fourths of the respondents expect to provide electronic mail, access to external and local corporate data bases, spreadsheet, graphics and modeling capabilities to workers in both these categories. In addition, professional workstations are widely seen to require their own WP function, and access to external data bases is perceived to be more important to high-level managers.

Attitudes toward OA are changing. Top management is increasingly aware of the contribution computer-based technologies can make to the long-term effectiveness of the organization. This awareness is undeniably selective. Many applications will be justified on the basis of cost displacement. Yet, management appears to be coming to terms with the fact that the value added by interactive computing by business professionals, for example, cannot readily be quantified.

Commitment to using information technology to improve the organization's competitive position within its industry is on the rise, as Figure 2 indicates. Respondents also expect the drive to reduce or control office costs to be relatively less important to top management support over the remainder of this decade. This shift in focus and the steady decline in equipment costs may be accompanied by decreased insistence on strict cost justification.

Many OA efforts are less constrained by the need to document improvement in narrow measures of performance. Decision makers appear more willing to gamble that the benefits gained from the use of office technologies will outweigh costs, and users more willing to adjust their budgets to accommodate computing costs.

This is to some extent an outgrowth of the momentum of the end-user computing phenomenon, and attitudes are likely to continue to change as this trend matures. Reduced insistence on strict cost justification does not imply decreased concern with results. The stakes have been substantially raised.

OA historically made inroads into the office through applications designed to improve the efficiency of routine information processing tasks through providing better tools (mechanization) or by delegating portions of the task to the computer (automation).

Fortunately, OA has not lived up to its (at best) misleading name. Although some OA implementations have been insufficiently concerned with effects on the worker, OA efforts have more typically been characterized by their concern for the interplay between office technology and human beings.

End-user computing also is a limited concept. It is useful to describe a stage in the use of computer-based technologies in organizations and separates today's environment from what came before. Yet, it is too narrow a term to encompass the organizational environment that interactive computing may eventually create. The momentum of end-user computing is engulfing the OA of the past. Advertisements for micros and related products, portraying them as extenders of human capabilities, have done much to diminish fear of office technology and to stimulate demand for it. The groundswell of user interest in office technology being experienced by large and small organizations has major implications for OA.

End-user computing, first and foremost, creates a favorable climate for extending and integrating past OA implementations. This favorable environment is not without its hazards. The OA/MIS staff faces the delicate task of reducing user expectations to realistic levels without dampening enthusiasm. Moreover, as initiative and responsibility for automating offices passes to the user community — where it rightfully belongs — OA professionals must alter their role. Despite sensitivity to user needs, responsibility for past OA projects was most often with OA staff in the role of expert.

However, much as the user orientation of OA professionals was an improvement upon the more technical orientation of the DP professional, it still withheld from the business unit critical aspects of decisions on technology use. Today's OA staff must be less experts than facilitators and must be less concerned with the details of OA implementation within worker groups and more attuned to maximizing the overall business benefit to be gained from deploying various OA technologies. When the goal is to develop and maintain optimum levels of organizationwide system utility and economy, caution in extending systems capabilities to functions that may not contribute enough value to enough people is in order.

OA professionals have developed a solid record of accomplishment in their efforts to bring computer-based technologies to the offices of large organizations. Large amounts of equipment have already been incorporated into office work with little perception of negative effect, and user demand is fueling dramatic growth through the end of the decade.

At the same time, the office automation environment is becoming significantly more challenging as the following changes occur.

- Demand shifts from cost displacement applications to those expected to add value or to extend the personal effectiveness of professional and managerial workers.
- Utilization of office technologies becomes more visible and important to top management.
- Organizations face the technical and financial hurdles to integration of today's fragmented systems into infrastructures that serve the entire organization. OA

Tarbania is an associate at Diebold Research Services of the Diebold Group, Inc., international management consultants based in New York.

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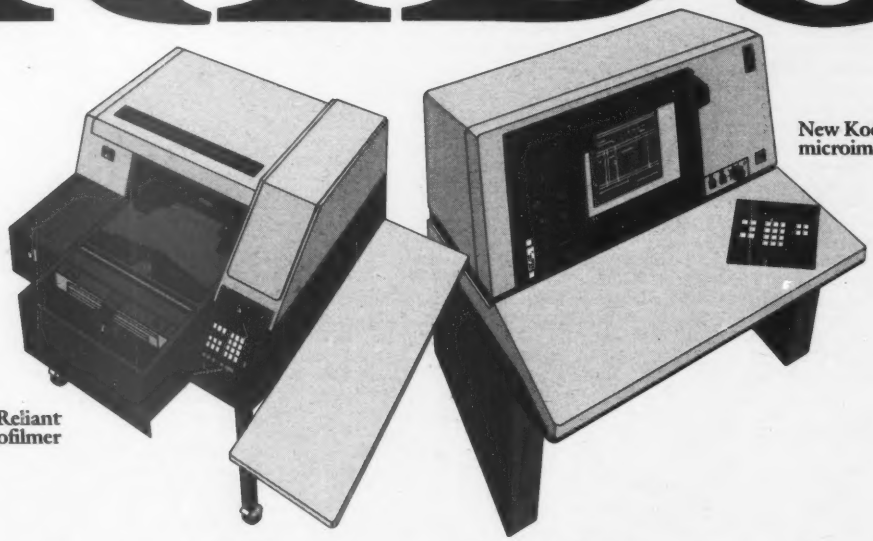

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WHY ARE THESE MEN SMILING?

BY GLENN RIFKIN

What can An Wang do for an encore? The Doctor's little electronics company hit the $1 billion mark in annual revenues in 1982 and, before you could say office automation, that figure doubled. On track to the $3 billion signpost, Wang Laboratories, Inc. has its pedal to the metal.

Unlike the old days, however, there might be a traffic jam or two along the way. Wang's rapid rise during the late 1970s came on the strength of aggressive marketing of its leading-edge word processing systems and integrated product line into Fortune 1000 companies. Its success on this level gave the Lowell, Mass., company bragging rights to the office for several years.

Wang Laboratories, Inc.'s Fred Wang, executive vice-president of research and development (left) and John Cunningham, president of Wang (right).

With a solid and cohesive product line, anchored by the highly successful VS minicomputer and OIS text processing system, Wang has created a powerful presence in the OA market. In the last few years, the company has experienced explosive growth, often at a rate of 60% to 70% annually. Though that rate is slowing down, it is still record-breaking for Wang (42% for fiscal 1984) and stunning by industry standards for a company its size.

Consultants agreed, however, that if the company's future is to be as rosy as its recent past, Wang has a tough job ahead. The "seductive call of IBM" has created intense pressure for Wang in its quest to remain a leading office vendor, according to Thomas Willmott, director of user research and services for the International Data Corp. (IDC). "There's an ax hanging over Lowell," he added.

"The market that Wang is competing in has changed dramatically," said Melody Johnson, an analyst with the Seattle firm of Cable, Howse & Ragan. "Three years ago, they were competing against the NBIs, CPTs and Laniers. Today, the players are IBM, DEC, Data General and Hewlett-Packard, and they all want a share of the OA market. Wang now has pressure from the big boys on top and the personal computer vendors on the bottom."

David Terrie, a consultant with the Boston-based Yankee Group, added that although Wang may perceive itself as *the* OA company, its traditional strength — word processing — is no longer enough to retain a high place in the market. "The market is buying on the strength of network architecture and professional application software — areas where Wang is traditionally weak."

In addition, consultant George Colony of Forrester Research, Inc. in Cambridge, Mass., pointed out Wang's inability to successfully sell single-user, low-end systems. "They need to be in that market in order to survive in the office systems arena," he stated.

Despite the question marks, Wang is on virtually every consultant's list of potential survivors in the expected industry shakeout. With a vast installed base, a stepped-up research and development organization and what is perceived as an extremely strong management team, Wang is capable of confronting and overcoming its problems, most observers stated.

Wang is as aware as anyone of the magnitude of its task. John Cunningham, president of Wang, predicted that by 1995 IBM will be a $160 billion company ("people will be screaming 'antitrust' ") and that only three or four major players will survive in the business.

"For these players to survive, they will have to have some kind of specialty that they do better than IBM. What we tried to do in the WP marketplace was take the sophistication and simplicity of the operator environment and use low-cost technology to get at that market. The same opportunity exists to get at the office system environment," Cunningham said.

"You're going to have IBM looking at the market from one viewpoint; the major communications carriers from another. The question is whether we can find the best of both worlds and get in between them to carve off a major chunk of that business," he added.

To assure that it will be among the survivors, Wang is focusing intently on moving its image from that of a WP vendor to a networking and communications giant. According to Cunningham, the industry's view of Wang as merely a WP maker is grossly uninformed. More than half of the company's revenues are from DP systems sales, he said.

The company began the image-building process on Oct. 4, 1983, when it announced its "Open Access" policy, along with a spate of major products and enhancements. Mired in a decidely Wang-only world and realizing that it must air some things out, the company published what were previously proprietary specifications for much of its product line, including its document format and interchange architectures.

An IDC report on Wang, "Major Vendor Strategies in the Electronic Office," stated, "If Wang is to maintain healthy growth, even if not at the phenomenal rates of past years, it must penetrate areas where it has not been well represented and must be able to coexist with systems that it will encounter in the larger world, that is to say, live with IBM."

While acknowledging the intent of its Big Blue rival, Wang remains committed to an evolving OA strategy that encompasses workstations, networks, office systems, data bases, application software and multivendor environments. This commitment to a long-term strategy has been a major asset, according to Sam Gagliano, vice-president of product planning and management.

"We decided at inception that we'd better focus our plans and stick to them," Gagliano said. "We haven't broken off into tangents that we couldn't support."

The Wang Professional Computer, however, introduced two years ago, has been less than a sensation in terms of sales. According to Fred Wang, executive vice-president of R&D, in the past year the company sold 65,000 Professional Computers, which was within 5,000 of projected sales.

Though industry consultants tend to agree that the Wang Professional Computer is sound technologically, there is widespread sentiment that the company has serious problems in that market.

"We have major coverage problems at the low end of the marketplace," admitted Cunningham. "We've had, over the past five or six years, a window of opportunity to get into the major account marketplace, and we put a tremendous amount of our direct distribution capability toward that effort.

"In doing that, we essentially pulled distribution capability for low-end products through independent sales organizations. We moved those people upstream into major accounts, therefore our distribution capability at the low end is not as good as it should be."

Cunningham pointed out that Wang has stepped up its efforts at the low end and ISO sales reached $180 million in 1984. He acknowledged that the Wang Professional Computer was designed as a major account tool, saying that "for most people it would be like buying a Maserati when all they need is a Chevy." He added that new products for the low end were on the way.

Analysts have predicted that the announcements, scheduled within the next week or two, would include a multiuser, multitasking personal computer based on Intel Corp.'s 80286 chip. The system, which reportedly will run a System V Unix operating system as well as a Wang proprietary operating system, will compete directly with the IBM PC AT announced in August.

Also coming is the long-awaited 1107, an Intel 80186-based word processing workstation positioned between the Wang Professional Computer and the electronic typewriter market. According to Colony, the 1107 will be bundled with a letter-quality printer and will sell for less than $3,000.

Colony pointed out that the introduction of the 1107 and other new workstations could hasten the demise of the OIS system, a prediction Cunningham strongly denied.

"OIS is a key part of the product strategy," he stated. "We have major enhancements coming to OIS this fiscal year that integrate it more into the VS family. The VS will grow faster than OIS, but OIS was close to a billion-dollar business this year. It's got a tremendous amount of applications surrounding it and that's not easy to replace." Cunningham did acknowledge that Wangoffice, a series of network-based software applications unveiled last October, would likely replace the Alliance OA system.

Willmott of IDC said he believes Wang is attempting to get their customers to migrate to the VS environment (considered by Wang to be its key product line) because of the lack of communications capabilities available for OIS. The limitations of the OIS system "hurt Wang's growth potential," he said. "A number of my accounts are thinking heavily about their future commitment to Wang. More and more will take the IBM route."

Wang is feeling Big Blue's breath on its back and is hard at work trying to deliver on its networking and communications promises of last October. According to Sam Gagliano, Wang's strategy is to provide a "Wang-unique" solution to both the local-area and wide-area network approaches as well as coexistence with IBM on both those levels.

Wangnet, the company's broadband-based local-area network, has been less than a bestseller. Because of the lack of enthusiasm, Wang brought out a scaled-down version of Wangnet, Fastlan, which reportedly does away with the installation and certification problems. According to Gagliano, interest in both Wangnet and Fastlan rose in May when IBM announced a delay of two to three years on its local-area network.

Wang has also broken tradition by looking outside its walls for partnerships in the private branch exchange business. Last year, it purchased 15% of Intecom, Inc. and has made deals with at least a dozen other PBX vendors around the world.

According to Cunningham, Wang is committed to twisted pair as the medium that will be the conduit for a "true end-to-end digital network" within three to five years. "We think you'll be able to do a lot more over twisted pair — either existing two-wire or four-wire — than most of the world thinks."

Wang is also actively working to deliver on its Wang Systems Networking (WSN) announcement of last October. According to IDC, WSN is not so much a product as a statement of direction. WSN is intended to provide a layered architecture following the International Standards Organization Open Systems Interconnection model.

Among the other October announcements under industry scrutiny are Wang's Word Processing System Document (WPS-CS) and the Wang Information Transfer Architecture (Wita). The release of these once-proprietary specs was somewhat of a gamble for Wang, according to IDC, in that it might lose potential desktop sales. But it serves to enhance the company's position as industry standard, and that should benefit Wang in the long run. In fact, at least 35 companies have licensed the use of Wang's Wita formats already, said Gagliano.

In committing itself to a coexistence strategy, Wang also stated its intention to support DIA DCA and to gateway to IBM data bases. Wang's own data base product, Pace, is "what we perceive as the best that's been announced in the industry," Fred Wang said.

Finally, the product that received the most attention at the October announcements was the Professional Image Computer (PIC). PIC, which scans and digitizes images and allows them to be incorporated in editable documents on Wang's office systems, is considered a product in search

of a market. "They're not selling many of them," said Colony, "but it shows the company is innovative and has put them ahead of IBM in imaging. Once it gets married to videodisk technology, however, life could get interesting."

Fred Wang is even more optimistic. "If we do our job right, the PIC product line could end up being bigger than word processing is to us now. We think it's a potential multibillion-dollar product line."

As Wang heads toward the $5 billion mark, its laundry list of questions will undoubtedly grow longer. As the IDC report stated, "Wang has problems of a sort that many of its competitors would like to have: the problems of rapid and protracted growth."

As the company has grown, for example, its reputation in service and support became suspect. It has been difficult, company officials acknowledged, to continue adding new staff and to get them trained quickly enough to keep up with the tremendous service needs in the market. Wang's admittedly inefficient in-house administrative systems for ordering and invoicing have also added to the image that Wang is a difficult company to deal with.

Cunningham admitted that the company had serious problems in service and support in 1979 and 1980, but said the situation has been reversed. Wang has more than 4,000 field service engineers (up from 525 in 1979) and has spent upwards of $500 million this year alone on service and support.

"We have a very complex product line and a complex strategy. It puts tremendous demand on the support organization," he said. "When you pull in 20,000 service calls per day, I'll guarantee a couple didn't get fixed right, but I think we do a better job than anyone else."

Unfortunately for Wang, the perception of poor service remains. Terrie of the Yankee Group said, "They are trying harder, but the problem keeps getting larger. They're chasing a moving target."

Interestingly, whatever the customer experience may be, it has not hurt sales. "A customer may say 'Wang has lousy service, and they lie to us and, by the way, I'm going to spend $5 million on Wang equipment,' " Colony remarked.

Despite its current problems, Wang's toughest test lies ahead as it begins to encounter the unique tribulations of being a multibillion-dollar corporation, according to consultants.

As the IDC report stated, "Growing at 30% in a market that is growing at 15% means taking share away from other competitors, which is a good deal harder than gaining share by selling to first-time users. Despite its solid performance record, Wang cannot afford *not* to succeed in becoming a full-line OA vendor."

Perhaps its greatest asset is a stable management team which, for the most part, has remained intact for nearly 10 years — a remarkable record in the volatile computing business. An Wang, the company's 64-year-old founder, has lately focused more on the future plans for the company and left the day-to-day operations to Vice-Chairman Harry Chou, Cunningham and his son Fred.

"Wang is reaching a critical point," Colony said.

"But they are R&D-oriented and innovative, have a fast product cycle and continue to take chances. I like the way they're approaching the $3 billion mark," he added. OA

Rifkin is senior writer at Computerworld OA.

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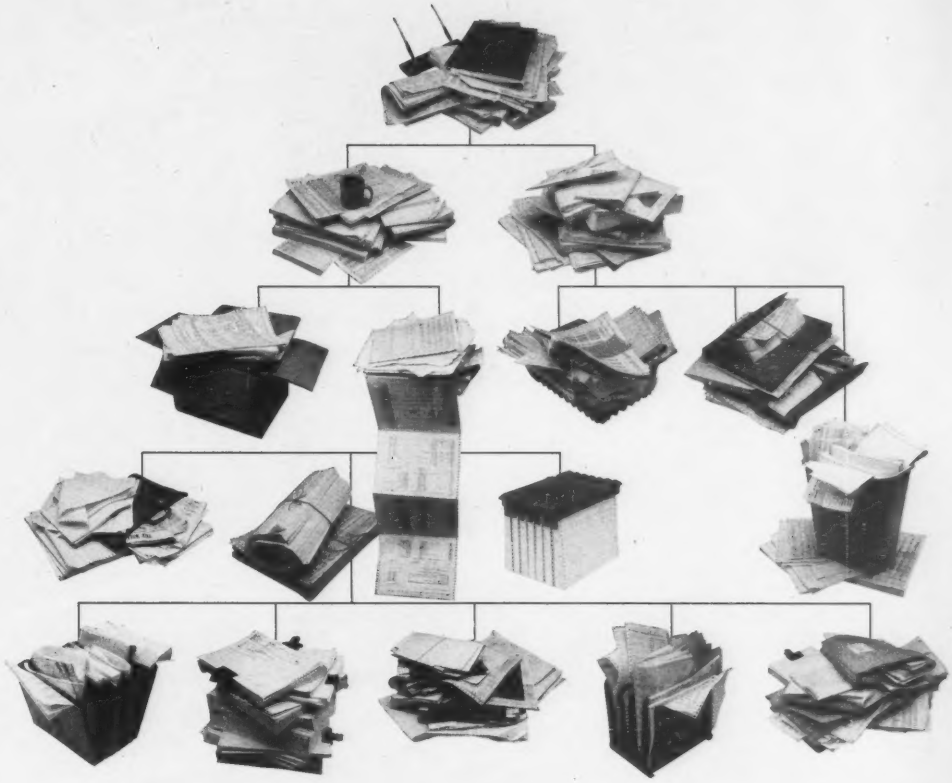

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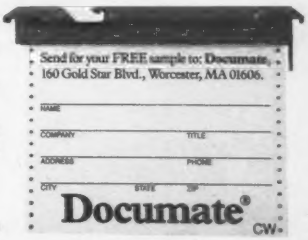

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OA FOCUS: WORKSTATIONS

The workstation has been undergoing a steady and sometimes not so steady evolution of products, name changes and target markets. Is the latest evolutionary step — the personal computer — the universal workstation, or is there more yet to come?

This Focus section looks at where workstations have come from and where they're going. It also examines what users are really looking for in the ideal workstation and how soon that ideal will become reality.

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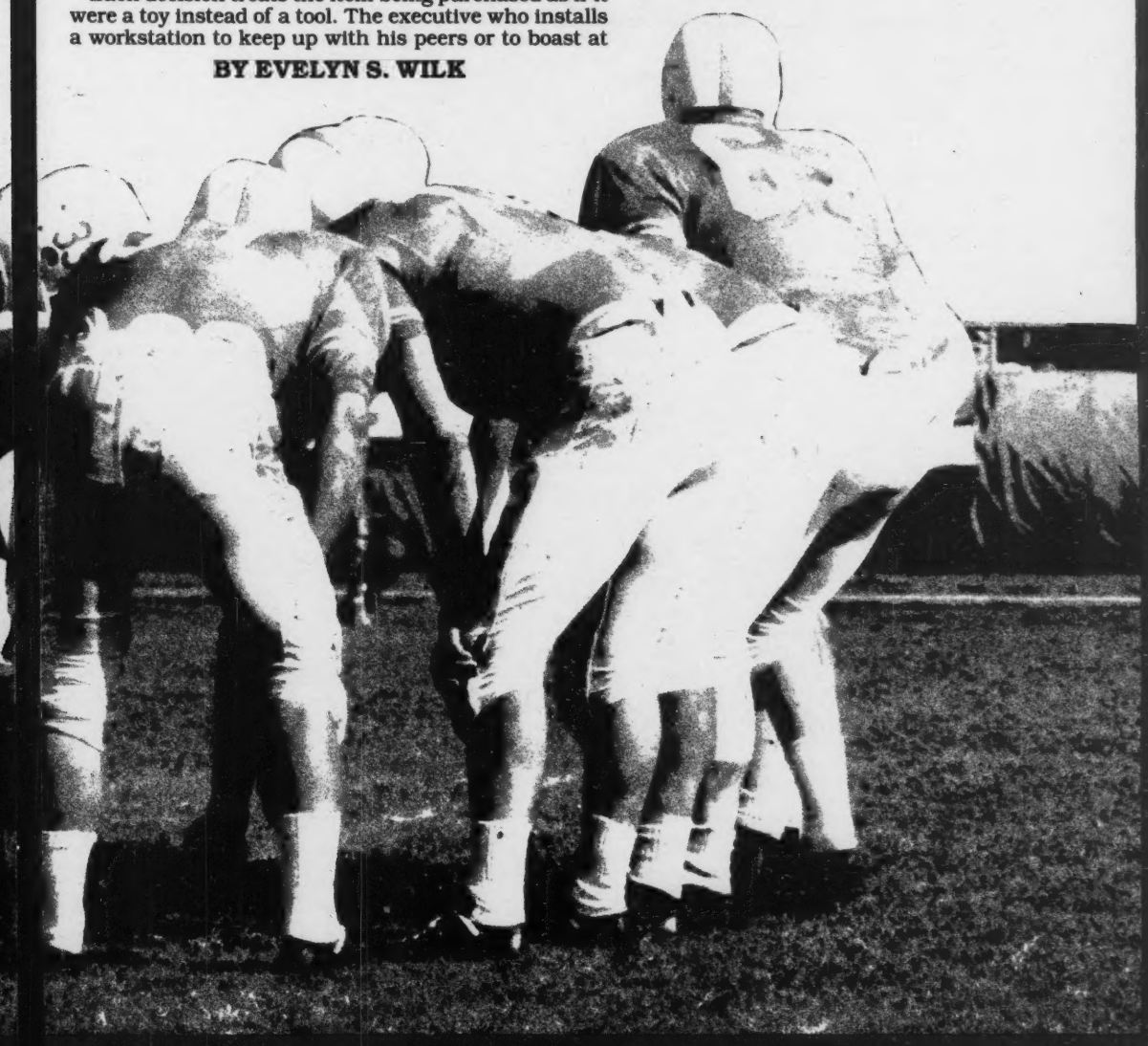
1

PLANNING THE PURCHASE

Buying an executive workstation solely because of its functions and features is like buying an automobile because it has a great stereo system. Both decisions ignore the underlying reason for the purchase — transportation, in the case of the automobile, and support for the executive's business activities, in the case of the workstation.

Each decision treats the item being purchased as if it were a toy instead of a tool. The executive who installs a workstation to keep up with his peers or to boast at

BY EVELYN S. WILK



the country club will derive little real satisfaction from his purchase (and will probably end up giving it to a subordinate who can "really use it"). On the other hand, the executive who takes time to identify the business need will purchase a tool with a purpose.

Several recent studies indicate that white-collar workers at all levels will install workstations in astounding quantities over the next few years. International Data Corp. (IDC) forecasts that by 1990 there will be 27 million workstations in the U.S. The Bureau of Labor Statistics tells us that the white-collar work force will number 60 million by that time. By simple calculation, that's one workstation for every two white-collar workers — a fivefold increase over today's installed base.

Executives at all levels are becoming more comfortable with the idea of using workstations in their daily activities. They have begun to look beyond hardware bells and whistles and to consider the business applications workstations can support. Most business activities can be subdivided into the following categories:

• ***Planning:*** Every business activity begins with planning. Goals and objectives are set; schedules and deadlines are determined. Even repetitive tasks require a periodic step backward to determine if they are still meeting their original objectives.

• ***Researching:*** Information is searched out and retrieved. Data is gathered and compiled. Preliminary reading determines what is relevant to the task at hand.

• ***Creating:*** A variety of methods exist for creating — dictating, writing out in longhand and composing directly at a CRT workstation (or a typewriter). However, the creation activity is more than this. It includes development of graphics and other visual information as well as — or in place of — text and numbers. It also entails a lot of thinking.

• ***Analyzing and Evaluating:*** Business activities are not simple linear chains of work steps. They are most often an iterative process, with analysis and evaluation an integral part of every step. Users edit text, model data, ask and answer a multitude of "what if" questions and continually discuss the implications of the analytical results.

• ***Communicating and Presenting:*** No business activity occurs in a vacuum. Information is delivered by phone and in person, as well as on paper. A workstation offers the option of electronic delivery. Presentation ranges from an informal discussion of new ideas to formal speeches or reports with accompanying professional graphics or heavily footnoted text.

A review of these activities reveals several trends. First, these activities are oriented toward business functions, not hardware functions. A variety of hardware and software can be selected to support various combinations of these activities. Also, they are independent of data form. The information an executive analyzes may be in the form of graphics, text, numbers, voice or any combination of these data forms. Therefore, any workstation meant to support the executive must be flexible enough to handle a wide variety of functionality and data forms.

Another trend is also observable: The higher a person rises in the organization, the more his activities cluster at the bottom of the list. Professional workers, supervisors and first- and second-level managers are the people who research and create. Upper level executives primarily act on information created by others. They assess and evaluate, call for additional input and, finally, do what they are paid to do — make decisions.

An integrated automated system of executive workstations must be able to support all the activities mentioned above and more. It must be able to support those managerial activities that are not automatable. Some of these tasks are reading, thinking, discussing and meeting. Although the workstation cannot help users to read faster or think less, it can support other activities with the potential to accomplish the following:

• Make the information the executive reads more concise and relevant.

• Give the executive nutritious food for thought.

• Provide direction and focus for meetings and discussions.

The automated support tools provide the executive with the resources to assist and aid in the decision-making process itself. After all, machines don't make decisions; people do. The workstation should not be expected to take on managerial decision-making responsibilities.

No executive needs equipment to be successful — by definition, an executive already is successful. Therefore, the equipment had better bring something to the table. At the lower levels of workstation use, it is probably enough for the workstation to automate a narrow range of tasks — spreadsheet manipulation and text processing are the two most popular. But even middle management levels deal with a wide variety of information, and the workstation must be an aid — not a barrier — to manipulating that information.

A discussion of workstation needs must not stop at the workstation itself. Offices are communities of people sharing elements of the same information. These people need access to corporate data on the mainframe and to research data from both internal and external sources. They need the ability to manipulate data in one form (perhaps spreadsheet), but present it in another (graphics). If managers are to have the support they need, integrated software and hardware are necessary.

No executive needs equipment to be successful — by definition, an executive already is successful. Therefore, the equipment had better bring something to the table. Even middle management levels deal with a wide variety of information, and the workstation must be an aid — not a barrier — to manipulating that information.

In fact, the interconnection between users and the sharing and transfer of information provides the real "bang for the buck" of automated support. Tying workstations together physically is not enough. An integrated system of workstations requires software to manage file functions on the desk, to manage printers and to provide security — in short, to turn a combination of individual processes into more than the sum of their individual parts.

Beyond the workstation, shared computing power is needed, not only for file support, but also to put data from corporate files in a form that can be accessed by the workstation on an ad hoc basis. Unless automation is approached as a comprehensive integrated requirement, companies will run the danger of automating only part of the business function. That is tantamount to not automating at all; failure is almost a foregone conclusion.

Managers and executives seldom work at one task at a time. Their day is "interrupt-driven" and the workstation should emulate that environment. One problem with today's single-tasking operating systems on personal computers is that lack of interrupt functionality. Integrated systems of workstations that offer multitasking capability are better suited to the executive environment.

Nevertheless, the most sophisticated multitasking system won't be used if it is perceived to be a toy, not a tool. It becomes imperative to step back from the details and ask these questions again and again: For what purpose will the workstation be used? Will it support a critical business function? Will it help to get the job done better? Will it help reduce information float among divisions of the company? If a company, a department or an individual executive cannot find a business reason for installing workstations, it is better to wait.

When should an executive consider using part of the valuable desktop real estate for a workstation? The following (by no means comprehensive) is a list of some conditions that indicate that time has arrived.

• To support a specific business activity. It is no longer necessary to plan for 100% utilization of workstations; in fact, the attempt is ludicrous when the workstation is in an executive's office.

Compare the executive's earnings with the cost of a fully loaded workstation ($7,500 to $10,000 by the time complete functionality is added). A weekly time savings of as little as five hours can easily justify the acquisition. Some companies may find this concept hard to swallow; they expect all equipment to be utilized to capacity. However, think of the telephone: Is it used constantly, even when the executive is away from the office? The workstation is a parallel example: it is there to maximize executive productivity, not the other way around.

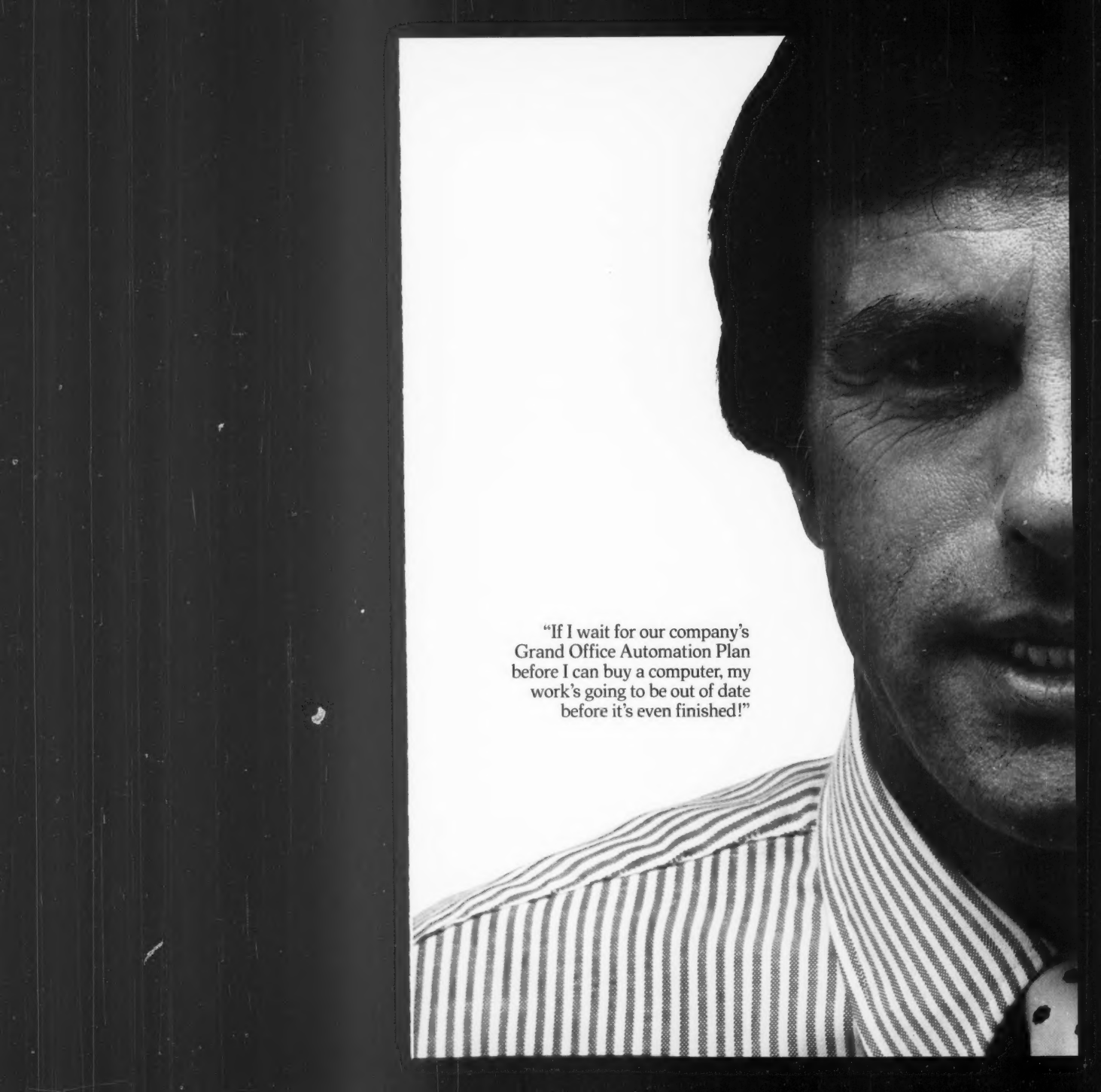
• To become a member of a community of users. Organizations often install workstations first for clerical staff and then for professional staff. When a "critical mass" of workstations is available, functions such as electronic mail become standard within the group. If management is left out, the staff will continue to do double duty, preparing information in two formats — one for workstations, the other for paper. The extra effort negates the gains workstation use provides.

• To provide access to corporate information. Simple inquiry is often the first use of a newly installed executive workstation. This function seems to bear a disturbing resemblance to the use of the workstation as a toy. They are not the same; rather, simple inquiry is a good educational tactic to use on the executive who has (but won't admit to having) keyboard or CRT phobia. It allows the executive to cut his teeth on a simple but useful function. By doing so, he gains the time to become competent and will soon begin to experiment with functions that more directly support the business tasks at hand.

The next few years present an enormous challenge to those whose task it is to oversee the automation of their offices. Implementors and executive users who look for the business reason behind workstation use — not for the entertainment value of bells and whistles — will be guided into successful implementation of automated tools that help people do their jobs. OA

Wilk is a senior manager with Arthur Andersen & Co. in Chicago.

Most companies are seriously divided.


"If I wait for our company's
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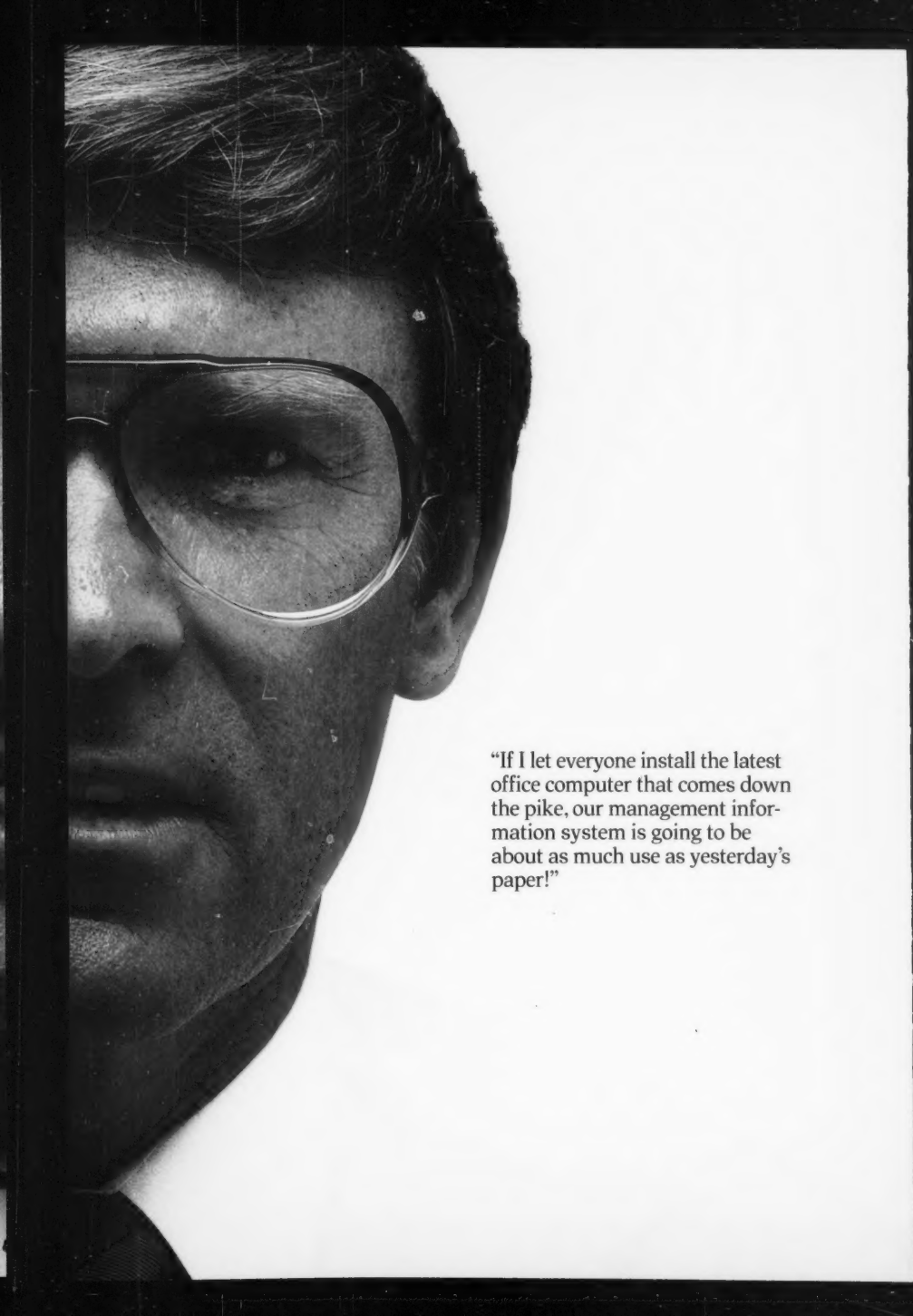
before I can buy a computer, my
work's going to be out of date
before it's even finished!"



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with new software as mu
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is as important as the t
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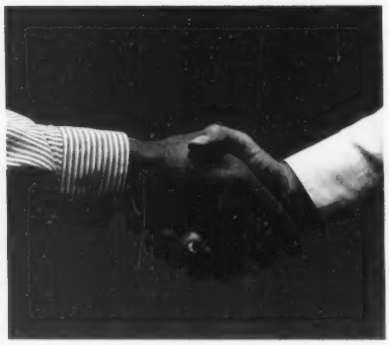

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SPOTTING THE TRENDS

A history of the office automation workstation marketplace would show that the name of the game in the late 1970s was word processing workstations.

In the early '80s, several vendors tried their hands at managing the professional workstation marketplace with highly priced but functionally mediocre products that achieved no real U.S. market penetration.

Then, of course, the dam broke loose: The corporate world was introduced to the personal computer, which was supposed to become the savior of all involved in the workstation marketplace. In the personal computer, some saw a uniform piece of hardware upon which they would build

BY THOMAS R. BILLADEAU

PHOTO © 1984 GLENN RIFKIN

that utopian OA workstation — the machine that would require only software development because everyone would buy a personal computer no matter what.

Well, now it's 1984, and lots of personal computers sit on the desks of people who were targeted for an OA workstation. Yet the question is still unanswered: Is this personal computer the right device to have there?

Underneath this question lie a number of issues, among them the following:

- Is the personal computer a powerful enough workstation to perform the tasks required in the OA world?
- Are users simply buying low-end personal computers that don't meet the OA challenge, and then blaming their problems on the personal computer?
- Are users unwilling to take over the support roles that surround the decision to use personal computers as OA workstations?
- Have vendors, tacitly accepting the fact that the personal computer will be the OA workstation of tomorrow, stopped working on new workstation solutions of their own?

Although none of these questions has a clear-cut answer, they all represent valid points that must be addressed. However, it should also be remembered that the power that exists in most of today's personal computers (as used here, the term "personal computers" refers to the world of the 16-bit IBM Personal Computer and its look-alikes) is more than enough to allow them to act as OA workstations. However, a big "if" follows this statement — *if*, and *only if*, that personal computer is properly configured.

It has always been my contention that, for various reasons, an OA workstation needs local storage or very quick access to very nearby storage (such as a work group file server). Yet the vast majority of personal computers in the office are floppy diskette based and, furthermore, a fairly large number have only one floppy!

It is unreasonable to assume that a user wants to or will effectively manage a library of floppy diskettes. Someone in the organization will have to train others in the basic concepts of computer hygiene. Dental hygiene is difficult enough to put across, much less the care of floppy diskettes. Discounting personal computers out there without a hard disk or very close access to a part of one will eliminate over 65% of the personal computers in the corporate environment.

What about the personal computers with so little memory they can barely remember they're personal computers, let alone OA workstations? These are the 64K-byte units and the 128K-byte units.

To do anything interesting with regard to user interface and still use local personal computer-oriented functions, users need machines with 512K bytes of memory. The next generation of software is going to call for megabytes of memory. Waiting for something to happen is not in the design specification of the product that will be accepted as an OA workstation.

Screen and keyboard versatility are indeed important in an OA workstation and on this level personal computers score as highly as anything else. It does seem obvious that users' needs vary with regard to screen size, resolution and choice of color or monochrome.

Keyboard needs also vary and, although this topic has been addressed, it has not received the amount of research it deserves. It seems clear that the "standard personal computer keyboard" will not suffice for the full-time typist. However, it's also clear that the keyboard designed for the nontypist would also have its place on the desktop.

Communications presents another issue that must be given attention. OA users don't want communications, they want the results. They don't want access to a remote host, they simply want the information that exists at the remote host. Communication on an OA workstation is a tool for the developer. It should, in essence, be transparent to the end user, and the personal computer world has not even come near achieving this end.

In some fashion, the OA world will have to take into consideration what the personal computer can do within an OA system and allow the device to do whatever it can. This is true by virtue of the number of personal computers already in place and the additional number that will be installed in the next several years.

However, in order for these devices to be really useful within an office automation environment, they will probably have to be what are generally termed high-end personal computers, not toys with 64K bytes of memory and one diskette drive.

How about the real OA workstation — is anything going on in this area? The answer is a resounding "Yes."

Many OA workstations will have an equivalent of an IBM Personal Computer-compatible device, which will allow the user to do anything he would do on a personal computer. An OA system, for purposes of this discussion, is a system that serves an entire corporation — nontechnical computer users — with the benefits of computer technology.

OA users don't want communications, they want the results. They don't want access to a remote host, they simply want the information that exists there. Communication on an OA workstation is a tool for the developer; it should be transparent to the end user.

The system serves as the users' link to corporate information and includes functions such as word processing, electronic mail, scheduling, data base management and other functions associated with OA. However, each organization will add custom functions to its environment, and each user should also be able to augment the system at the local level.

In the context of workstations, the important part of this definition is the part that states that OA is a systems product and that it will probably be augmented and customized at both the corporate and individual levels.

The part of the OA workstation that contains the equivalent of an IBM Personal Computer will allow the individual user a level of customization that will most likely be satisfactory. The system's customization will be at the departmental or corporate level and should not affect individual workstations.

The ideal homogeneous environment for the end user must not require that user to understand how the workstation is tied to a departmental system (which is tied to one of the many corporate systems, all of which are networked together).

These architectural considerations are unimportant to the end user and, indeed, they are much more complex than most want to understand.

It might be useful at this point to paint a scenario for the OA workstation. A user sits down and wants to create a memo.

The word processing used to create the memo is a local function; the word processor resides locally within the workstation. All the user knows is that the word processor is responding as required to write the memo.

When the memo is completed, the user wants to distribute it to various people within the organization. Electronic mail is the function chosen to do this. Without the user's knowledge, he is connected to a departmental system where mail directories and a mini post office live.

The memo is distributed by means of a process that allows the user to choose either a distributed list or several names. Off goes the memo.

The user never knew he left the environment of his own workstation. He knew only that the necessary function was made available in an environment that was not foreign.

Many OA workstations scheduled to be introduced over the next 12 months incorporate this concept. These units may take the concept a bit further than it has been taken to date, in that other functions will be incorporated in the workstations. For instance, it is not uncommon to see voice incorporated into OA workstations being developed today.

A good example is the Sydis product that will pop up in at least one major vendor's product line in the next year. This product takes all the common office automation functions and allows them to be used in conjunction with the telephone. We still use the phone a great deal and it has been left out of most OA systems to date.

Metaphor Computer Systems, Inc. will also announce its workstation product within the next few months. This announcement is generating some interest because the firm's two founders were intimately involved with Xerox Corp.'s Star product.

The next 12 months will also be a year for specialized workstations. There is still a market for highly specialized workstations that fit into an existing environment. The Interleaf, Inc. product is a good example of a very highly featured graphics/technical manual production workstation.

The warning has been sounded. The workstation marketplace is still very much alive and moving forward. Those who believe the only thing out there will be a personal computer in one configuration or another should begin to think differently this year. Personal computing is here to stay, but the personal computer is far from being the end of the development road. OA

Billadeau is president of The Office Systems Consulting Group, Inc., located in Cambridge, Mass.

3

FUTURE PROSPECTS

In the end-user driven information systems market, hardware vendors have focused an increasing amount of attention on grabbing a share of the workstation market. As vendors face the challenge of differentiating their products in this competitive environment, users face an equally difficult challenge: evaluating and acquiring the workstation best suited to their needs. The direction in which the workstation market will evolve, however, is still not clear.

This article attempts to step back from the immediate challenges of the marketplace and focuses on one possible evolutionary scenario and its potential impact on the workstation marketplace. In order to set the stage for this

BY TIM CAFFREY

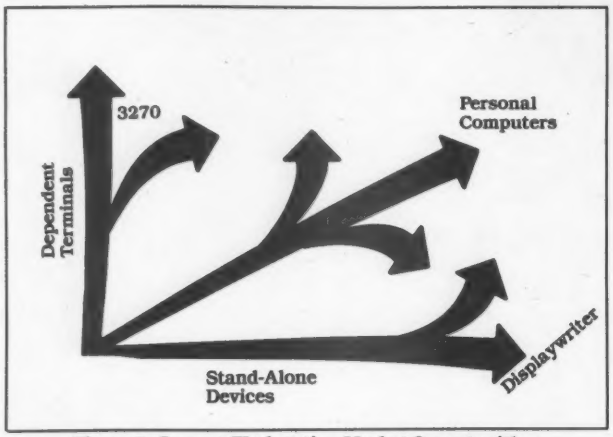

Figure 1. Current Workstation Market Opportunities.

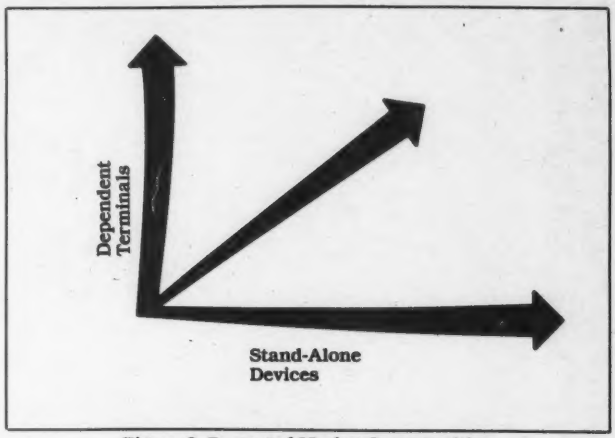

Figure 2. Protected Market Opportunities

scenario, it is important to define the term "workstation" and to illustrate the current state of the market for these devices.

An excellent representation of the current market can be derived from an IBM depiction of its workstation strategy, depicted in Figure 1. The two axes in Figure 1 represent the origins of today's workstation market. The vertical axis depicts devices that are totally dependent on larger processors for their value. These "dumb tubes," typified by IBM's host-dependent 3270, represent the traditional DP workstation.

The opposing extreme is represented on the horizontal axis. These devices are intelligent, stand-alone machines currently represented in large organizations by stand-alone word processors, such as IBM's Displaywriter and Wang Laboratories, Inc.'s Wangwriter.

As depicted, the strategy of vendors like IBM is to define niches in the workstation universe. These niches represent various levels of integration of the two characteristics of the horizontal and vertical axes.

In other words, the market is clearly being defined by workstation devices that run the gamut from relatively expensive stand-alone devices to less expensive communications-dependent terminals.

For IBM, the Personal Computer was the first large-scale attack on the middle ground. Represented in Figure 1 as the diagonal arrow, the Personal Computer market proved that major market opportunities lay in building a machine that shared characteristics of terminals and stand-alone devices. In ensuing months, announcement of the 3270 PC, 370 XT and other workstations branched off to target new markets and opportunities. At the same time, other vendors were positioning workstation families to compete in a range of niches across the market universe.

The critical question — both for vendors involved in workstation markets and for individuals who plan to manage workstation acquisition — is whether the market will continue to branch out to cover the complete universe of possible configurations.

The contention made and defended is that this continued branching represents only a temporary market surge. Although it will certainly be possible to position products on any point in the potential universe, the range of viability will not continue to expand. Rather, it will actually contract, in the direction depicted in Figure 2.

The axes shown in Figure 2 are the same as those shown in Figure 1, but the area covered by viable workstations is much narrower. As depicted, this market encompasses devices that combine a relatively high degree of both communications and independence. The bottom line is the death of the stand-alone unit and the dumb tube.

Three market dynamics support the contention that the field of opportunity is narrowing, not expanding. The first of these, affecting both supply and demand, is the expectation that hardware prices will continue to fall. This makes workstations real commodity items. The cost of memory, storage, processing power and a host of other workstations components will continue to fall. Vendors will be able to pack more features per dollar, but two significant demand factors will also exert their influence.

The first of these is the continuing movement away from the centralized time-sharing environment that spawned the market for dumb terminals. Large processors will continue to play a critically significant role in information systems architectures, but growing demand for local processing power will significantly alter expectations of workstation functionality. This evolution toward a more evenly distributed systems architecture is shaping the demand for increased local intelligence.

Although demand for local processing power would appear to push workstation market opportunities closer to the horizontal axis, a third factor is acting to balance this influence. This factor stems from growing recognition that stand-alone devices are in many ways antithetical to office environments. The convergence of individuals on a single physical location, be it office or manufacturing facility, is intended to promote group interaction and cooperation. Accordingly, communications capabilities play an increasingly vital role in workstation design and selection.

The logical result of this scenario is that stand-alone personal computers and time-sharing terminals, as traditionally defined, have seen their heyday. The trend toward more flexible (general-purpose) networked devices has taken hold.

For confirmation, one need only look at the tremendous amount of interest in intelligent micro-to-mainframe links, low-end microcomputer networks and multiuser systems. Traditional stand-alone vendors such as CPT Corp., NBI, Inc. and Compucorp, Inc. are also responding with communications networks and gateways to nonproprietary operating environments.

Given the trends outlined above, vendors are faced with differentiating their products in a more narrowly defined marketplace. Accordingly, the matrix of features that will distinguish successful products will undergo important changes. Several areas are ripe for exploitation; four of the most driving are portability, user interfaces, hardware customization and connectivity. If one were to describe the successful workstation of the future, the following outline would cover the major points:

- ***Portability:*** Although current technology limits the ability of truly portable computers to match features of full-size desktops (particularly in the area of screen design), technological advances will bring the intuitive value of portability to the fore in selection decisions.
- ***User Interfaces:*** It is clear that, in order to appear to compete effectively, a workstation must offer a variety of interface options. On the hardware side, features such as the touch screen and the mouse will be options on most competitive workstations. Voice recognition, still in its infancy, will also be required for certain applications. In the software area, artificial intelligence-based systems, such as natural language processors and inference products, will gain credibility.
- ***Hardware customization:*** A necessary component of future workstations will be the ability to build customized systems from peripheral chips. Although chip-based modems are only now gaining market acceptance, users will come to expect voice recognition; network interfaces; and data base, graphics, and language processors at the chip level.
- ***Connectivity:*** A hallmark of the new generation of workstations will be the progression beyond a single vendor-oriented communications capability. Workstation requirements will include the ability to communicate to a wide variety of networks, processors and software environments. Chip-level network interfaces, emerging industry standards and the demands of multivendor environments will make multifaceted connectivity a workstation standard.

Trends toward a more narrowly defined workstation market have been described here, and four areas for product definition and differentiation were highlighted. These trends will have significant impacts on users and vendors.

The consequences for vendors are clear: such a scenario will support far fewer participants than the number active in the market today. Product selection will be based on image, user experience and a long list of available options.

For users, the maturation of the workstation market will signal the end of the technology-driven marketplace. OA

Caffrey is program manager for the Strategies for Microcomputers and Office Systems Program at International Data Corp. consulting firm in Framingham, Mass.

4

SUPERMICROS SCORE POINTS

With the influx of electronic typewriters, word processors, personal computers and desktop terminals, one would think the office marketplace would be crowded to overflowing. But just when office automators were beginning to make sense of the onslaught, a new machine has made a bid for the desktop of the future and, if analysts are correct, it may change the face of the marketplace completely.

The supermicrocomputer, the powerful multiuser, multitasking machine built around 16-bit and 32-bit architectures, has already made a name for itself in scientific and technical marketplaces — for example, computer-aided design and computer-aided manufacture (CAD/CAM). Now,

BY GLENN RIFKIN

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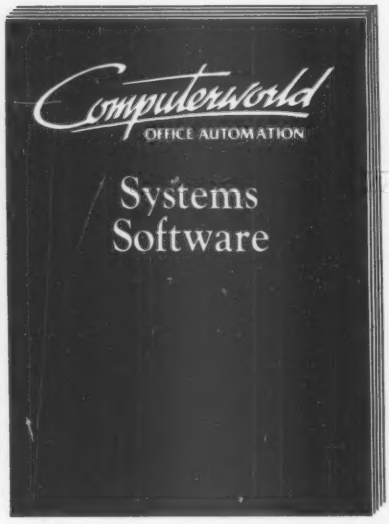

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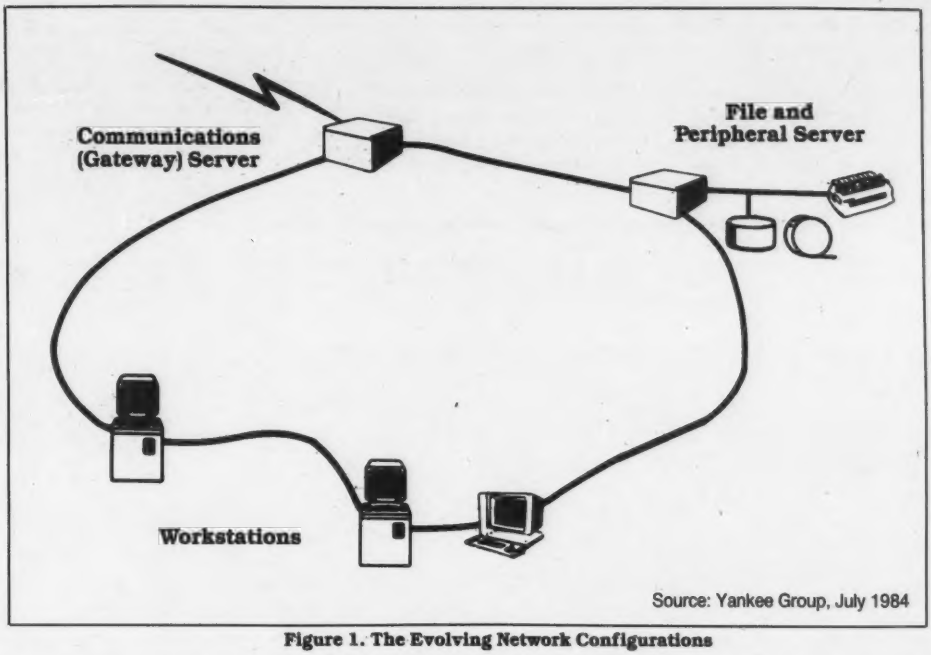

Figure 1. The Evolving Network Configurations

however, the commercial value of the office automation marketplace is attracting the attention of a flock of major OA vendors and the supermicro solution is rapidly gaining popularity.

According to a Yankee Group research report, more than 100 supermicro start-up companies have entered the potentially lucrative marketplace (a $3.7 billion market in 1983) and virtually every minicomputer maker — including Digital Equipment Corp., Hewlett Packard Co., Data General Corp., along with NCR Corp. and AT&T Information Systems — has jumped into the fray as well.

Putting the final stamp of approval was IBM when, in August, it announced its PC AT offering. "All major vendors, by 1985, will have incorporated supermicros into their product lines," the Yankee Group report stated.

What the supermicro has initiated, besides vendor excitement, is a great deal of confusion in the market. First and foremost on the list of questions is just what is a supermicro? The supermicro is supposed to fit snugly into a new and separate category somewhere between the personal computer and the low-end minicomputer. Unfortunately, this niche is not very clearly defined.

Some organizations, like International Resource Development, Inc. (IRD) of Norwalk, Conn., have defined the market parameters simply by price. According to these definitions, any microprocessor-based product above $8,000 is considered a supermicro. As prices start to drop, however, that barometer loses its accuracy (the PC AT, for example, starts at $3,995). Others define the supermicro by architecture and performance; still others include number of processors and number of terminals supported.

The Yankee Group, realizing the difficulty of placing an all-encompassing definition on this amorphous product line, has settled for a fairly general description: The supermicro is "the application of microprocessor (VLSI) technology to provide high-performance or multiuser systems with a substantial price improvement over previously available technologies (typically 16-bit minicomputers)." The performance level of these machines should be at least at the 16- to 32-bit range.

While consultants and vendors struggle to define the supermicro, the most likely outcome of the debate has been predicted by Kenneth G. Bosomworth, president of IRD. He believes that, in the next couple of years, the supermicro will simply lose its identity and will "merge into the continuum of micro products." In five years, according to Bosomworth, these machines will be indistinguishable from both micros and minicomputers.

Whatever the future holds, the supermicro of the present has aroused a lot of industry interest, particularly in the office. Despite the confusion, the supermicro offers one more OA solution on a lucrative price/performance basis that should only get better over time. As an entry-level multiuser shared system, the supermicro is enticing to both small businesses and to departments within large organizations.

Countless start-up companies such as Convergent Technologies, Inc., Fortune Systems Corp., Altos Computer Systems, Inc., Zilog, Inc. and Durango Systems, Inc. have been hard at work trying to create and grab hold of the supermicro market, and the minicomputer vendors have been forced to keep pace. It is at their traditional market that the supermicro is actually taking aim and it has become clear to the DECs, DGs and Wangs that they had better jump in while there is still room in the pool.

"Sixteen-bit machines really called attention to what micros could do," said Bob Andrews, manager of component support products at Zilog. "With fourth-generation machines using 32-bit architectures, the performance levels are starting to rival those of mainframes."

Operating at levels around 1 million instructions per second (Mips), the supermicros are not quite as fast as traditional minicomputers, which are in the 1.5 to 2 Mips range. However, that performance level may be more than enough for many users, and it comes at a fraction of the price. In addition, unencumbered by proprietary operating systems, equipment and software requirements of the large vendors, the start-up companies have embraced Unix as the operating system upon which to build their supermicros. This move is opening up the market and giving independence to users, value-added resellers and original equipment manufacturers (OEMs).

In response, the mini vendors are bringing their proprietary systems to the micro level. DEC unveiled both its Micro PDP-11/73 and Microvax I. DG offered its Desktop Generation. Hewlett-Packard Co. has its HP 9000. It is clear from other mini vendors that more is on the way. Industry analysts agreed that in the office market, the mini vendors, along with IBM and AT&T, appear to have the inside track in the supermicro business.

"The mini vendors are savvy; they are coming in with lower priced entry-level systems and going after their own installed base," said Christine Hughes of the Gartner Group in Stamford, Conn. "In companies that don't want expensive minicomputers just for an office, the supermicro will offer price/performance that won't be so outrageous."

"In the Fortune 1000 OA market, there is a need for functionality these start-up vendors can't offer," added Laura Stuart of the Yankee Group.

That functionality is likely to fall into one of two categories. First, the supermicro has a potentially major role as a personal computer controller or departmental processor supporting multiple users with personal computers. The supermicro can also function as a communications server on both an internal and an external basis featuring such capabilities as protocol conversion and electronic mail.

Second, the supermicro can function as a data base server or true file server with record locking that gives data integrity on a departmental level.

According to Stuart Mencher, director of data systems marketing for AT&T, the supermicro offers personal computer users the opportunity to share both disk resources (thus cutting down on wasted memory) and peripherals such as printers and hard disks, thereby eliminating replications for each individual personal computer.

"It's simply a cost-effective way of sharing office systems," Mencher pointed out. "It's an attractive way of developing office systems that are not dependent on mainframes."

Mencher added that the personal computer gained its popularity because it was an alternative to the frustrating DP department backlog. Though the supermicro appears to be the evolutionary next step beyond the micro, Mencher doesn't believe the multiuser system will displace the single-user device. "There's a place for both," he stated.

Andrews of Zilog agreed. "Users are seeing more and more sophistication on the personal computer, and they simply don't want to wait anymore to do useful work. They want multitasking capabilities and clustering capabilities and the ability to run the more powerful applications. Users are getting impatient waiting just a few seconds."

The supermicro also allows the vendor (the mini vendor in particular) to provide consistent application software across a wider product line. As Dick Loveland, manager of product planning for office and information systems at DEC, pointed out, "The supermicro allows users in remote offices to run all the same applications (as home office users) without being dependent on a larger system." In addition, as a host to desktop terminals, the supermicro might provide a more cost-effective solution for handling office

functions than giving a personal computer to everyone, according to Loveland. "The supermicro can provide services they can't get on a PC, so the influx of PCs is actually fueling the demand for the supermicro," he said.

"Organizations starting with a clean slate can go forth and get a supermicro for the office solutions. But most large corporations are not starting with a clean slate, and it is not clear how the supermicro will fit in there."

In fact, despite the interest, there is still some question about the supermicro's welcome in large user offices. Bosomworth pointed out that the supermicro is particularly attractive to a user environment unencumbered by thoughts of "how this works with the mainframe. Organizations starting with a clean slate can go forth and get a supermicro for the office solutions. But most large corporations are not starting with a clean slate, and it is not clear how the supermicro will fit in there."

The Yankee Group believes the best commercial market for supermicro vendors is the first "system" installation in small and growing companies. In mid-size and larger organizations, built-in obstacles limit the encroachment of the supermicro. The need for networking due to multiple sites will require that supermicros conform to both local-area networking and X.25 standards.

According to the consulting firm, the opportunities for supermicrocomputer vendors to infiltrate the large markets include the following:

- For work group systems interacting with engineering departments (where Unix is the prevailing operating system).
- Among straight administrative /word processing work groups where mainframe compatibility requirements are minimal and supermicrocomputer vendors could offer users substantial savings over those offered by traditional suppliers.
- For customized commercial applications which could be more readily supplied by supermicro vendors.

Software development for the supermicro presents another question mark. Applications for the Unix environment are growing in number, but are still a far cry from the avalanche of proprietary software available to the minicomputer vendors. Because most supermicros are Unix-based, the office market for the machine faces another 12 to 15 months of uncertainty, according to Hughes. "How good Unix will be in the office is still a question," he explained.

AT&T's 3B2/300 supermicro, based on the company's Unix System V operating system, was actually a shot in the arm for the start-up companies that have built their existence around Unix.

The 3B2, with its 32-bit WE32000 chip, can support up to 18 terminals or serve as a resource manager to 16 IBM Personal Computers using AT&T's PC Interface software package.

According to the Yankee Group report, "Because AT&T has become the Unix standard bearer and

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will use supermicros as a wedge into IBM's accounts, Unix has become particularly distasteful to IBM." Despite its distaste, IBM unveiled a Xenix (from Microsoft, Inc.) operating system for its new PC AT. Not unexpectedly, the report concluded that over the next five years, the supermicro industry will be dominated by IBM and AT&T in commercial markets.

The next wave of technology is already at hand; full 32-bit chips are expected to become the standard for supermicros within the year. The decrease in the cost of chip technology has made it clear that desktop mainframe power is within the end user's reach.

For its part, IBM has just begun to ogle the supermicro market. The recent introduction of its PC AT was hailed by some as Big Blue's entry into the supermicro market. The Intel 80286-based machine supports only three users, thus drawing skepticism from some industry watchers who claimed that that was not enough to qualify as a supermicro. Indeed, an IBM spokesman stated that IBM views the PC AT as simply "the top of the line personal computer," although he acknowledged that at its price point it was "bound to cut into the supermicro market."

Industry watchers expect IBM to announce an upgraded version of the AT incorporating multiple 286 processors early next year. The new machine will serve more than 10 users and will therefore find itself in the heart of the supermicro battle. According to the Yankee Group's Dale Kutnick, IBM is currently struggling internally to resolve the potential marketing conflict between an upgraded AT and the low-end System 36 minicomputer with which it would compete. "I expect they'll just put them both out there and let the market decide," Kutnick said.

Letting the market decide may not be that simple, however. Just as the industry has kicked up a cloud of confusion over 16-bit and 32-bit supermicros, the next wave of technology is already at hand. Full 32-bit chips are expected to become the standard for supermicros within the year, and the gray area between supermicros and superminis will become all the more indistinct. The decrease in the cost of chip technology has made it clear that desktop mainframe power is within the end user's reach.

Some, like Bob Andrews of Zilog, believe the attempt to label every aspect of the technology is self-defeating. "Performance is the issue," he stated. "If a 16-bit machine does the job as well as the 32-bit machine, does it matter? The end user's impression is the only thing that's important."

The supermicro's effect on the office market, therefore, is actually not the key issue, according to Bosomworth. "There are several avenues available for the implementation of OA and all have different advantages for users," he said. "The right implementation is dictated by applications, data bases and numbers of users; not by the computer you have." OA

Rifkin is Computerworld OA's senior writer.

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Another example: a document is prepared on a Xerox word processor at Detroit headquarters and must be sent to a user at a Wang word processor in New York for further editing and printing, and to an IBM Displaywriter user in Tampa for review. The Xerox operator simply transmits the document to Soft-Switch at the IBM host and instructs Soft-Switch to route the document to the New York user and to the Tampa user. Through its directory, Soft-Switch recognizes that the sender and receivers are using different word processors and automatically translates the Xerox document into DCA, and then into Wang and Displaywriter formats. The resulting documents are then routed to the recipients.

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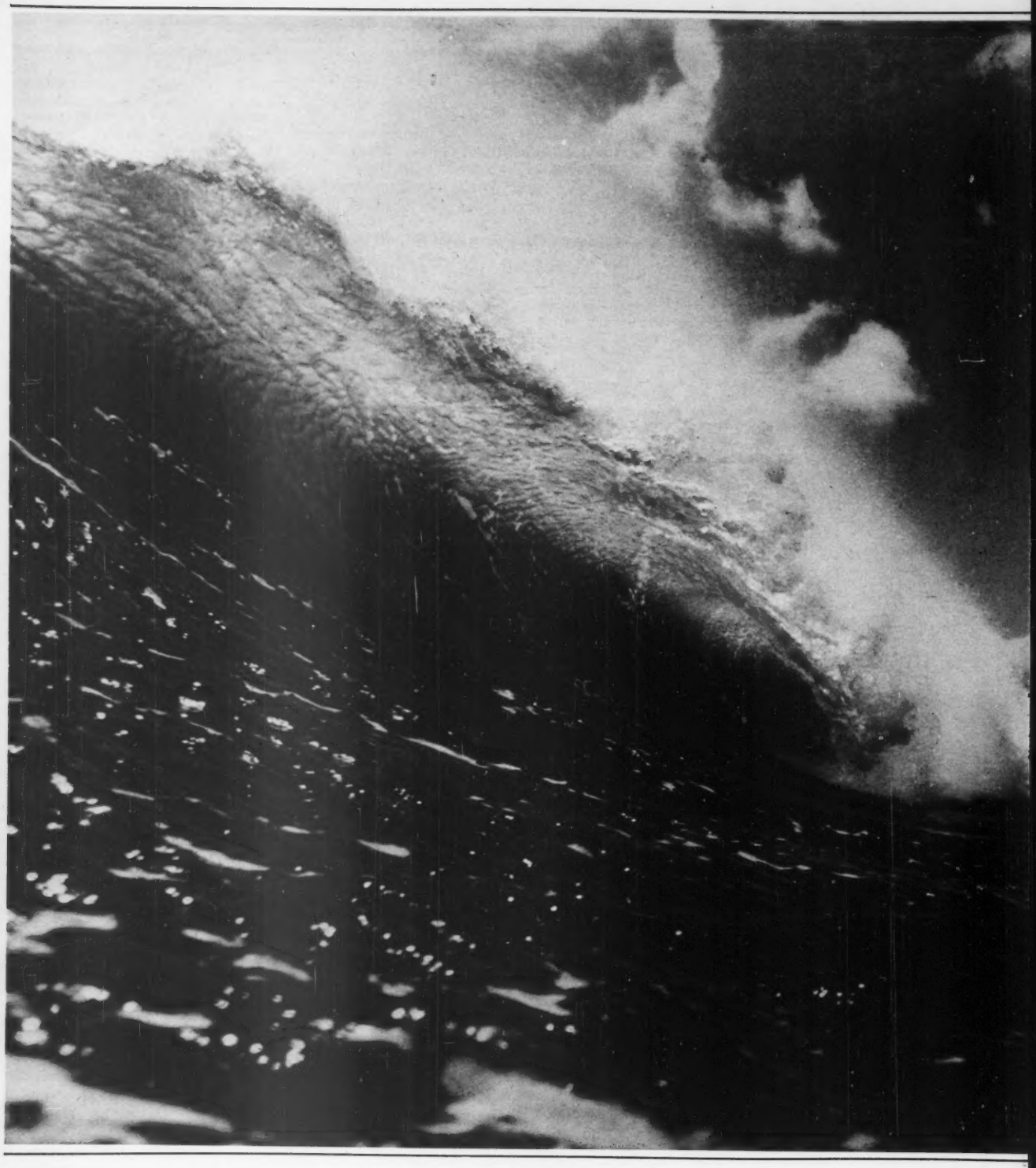

BY JOHN DACEY
AND JERRY MECHLING

THE NEXT WAVE IN ADVANCED SOFTWARE

Office automation software was targeted at generic tasks in the past; now, however, job-oriented and process-oriented software are emerging as the next wave in OA software evolution. Although this new software offers greater benefits, those benefits come at a greater cost and risk to organizations.

Work is not a seamless web. Rather, it is a complicated system of associated entities that must be coordinated. For example, organizational work may involve task elements (text insertion); tasks (word processing); jobs (preparing letters or reports); processes (handling customer requests and complaints); and even the totality of work of the entire organization.

Coordination and communication tend to be easier within an element than across boundaries. Supporting the task of word processing is easier than supporting the full job of preparing reports or the very difficult job of coordinating the work of people thrown together to work on a one-time project.

From the communications perspective, computerization has focused on a limited range of the management spectrum. Early computers were fast and accurate, but too expensive for anything except repetitive recordkeeping. The leading application was back-office accounting, with data entry and routine financial reporting receiving the most attention.

The applications were highly repetitive and structured in early computerization, and technical problems were more difficult than human problems. More recently, however, evolution has brought increasingly flexible and easy-to-use technologies, such as:

- On-line systems (mostly for accounting, order entry and other transaction processing applications).

Data base management systems (query-based applications).

Model and display-based systems (decision support applications).

Text and communications-based systems (OA — see Figure 1 on Page 52).

The information age has given birth to a tremendous need for better text management and communications. More than 50% of all U.S. workers are now in white-collar and service positions, and 75% of white-collar salaries are drawn not by clerks, but by managers and professionals. The target of opportunity for OA is extremely large; managers and professionals spend 75% of their time in some form of communications. Until quite recently, the potential of this target was unrealized.

The key development has been

personal computing and microcomputers.

The early growth of mainframe-based paper processing applications was painful and evolutionary at best; in contrast, the micro explosion has been relatively painless and revolutionary. The technology itself explains some of this growth; interactive power and a large market has resulted in friendlier software.

Personal computing has been driven by spreadsheets and WP — tasks that involve work and decision making by individuals rather than groups. A huge telecommunications and data base infrastructure did not have to be built to make Wordstar a valuable program. And a $5,000 decision is usually made (and often hidden) much more quickly than a $5,000,000 decision.

Personal computing has been driven by tasks that involve work and decision making by individuals rather than groups and that did not require a huge telecommunications and data base infrastructure. A $5,000 decision is usually made much more quickly than a $5,000,000 decision.

Organizational issues have largely been ignored or sidestepped.

The trend in OA software is integration — which usually means pulling tasks together to support more elements of a job. Data modeling and graphics and text come together to support the job of preparing financial reports. All this still works largely within the boundary of single-person tasks and jobs.

A more significant trend can now be seen: software to support organizational processes and, in fact, to allow and support entirely new organizational structures. Job support systems — which give broad support in the performance of a job, but do not span the individual's boundary — are a step along the way.

The futurists have been talking about such possibilities for a long time. Back in the '60s, predictions were that management in the '80s would be characterized by computer-led centralization.

More recently, Alvin Toffler, Paul Strassmann and others have predicted that computerization would undercut the need to control through standardization and size and that organizations would be characterized by flexible and smaller units.

One useful distinction in describing software is the difference between task-oriented and process-oriented systems. Although task-oriented software may be very sophisticated, it is quite simple conceptually. Task-oriented software is intended to increase the productivity of an individual task in the office. Products such as Lotus Development Corp.'s 1-2-3 and Context Management Systems, Inc.'s MBA integrate multiple types of task-oriented software.

Task-oriented software is developed by means of observations of a specific generic task performed in the office; a system is then designed to assist those who perform the task.

In a sense, word processing was developed by means of an analysis of the task of typing; increasingly sophisticated WP software then evolved.

In contrast, job-oriented or process-oriented software is developed by examining the way a specific job or process is performed; a system is then designed to increase the productivity of those who perform that process. Process-oriented software often draws on elements of task-oriented software as well as on traditional DP approaches. The line between DP and OA will continue to get fuzzier as more sophisticated process-oriented software is developed.

Job-oriented software is within the boundary of the individual and can be referred to as a job support system. Process-oriented software can span the individual boundary; when it does, it involves significant organizational opportunities and challenges.

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Although task-oriented software is sometimes referred to as horizontal OA and process-oriented software as vertical OA, this distinction is inaccurate. Horizontal OA is cross-industry software and includes both task-oriented and process-oriented software. Vertical OA is intended for specific vertical markets, such as law, accounting, banking and so on.

Until the past few years, there has been little evidence of major organizational impacts of any kind. By and large, general management has considered computers to be necessary, but competitively unimportant. Now, however, computers are emerging from the back office.

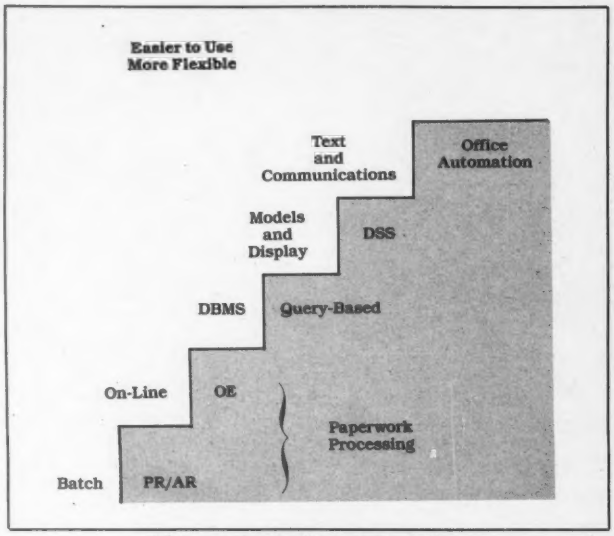


Figure 1. Technological Evolution

The most strategic impacts may not be centralization or decentralization, but rather the extension of boundaries of the organization to embrace tighter relations with customers and suppliers. For example, airline reservation systems have strongly influenced the decision-making processes of travel agents. Banks use automatic teller machines and other services as strategic tools. Insurance companies, taking note of the airlines, are trying to tie in their insurance agents through policy processing systems.

An internally oriented example can be seen in the case of Citibank, when it revamped its letter of credit operation. Instead of using computerization to attack a fragment of the organizational process — data entry — Citibank used it to enable a complete restructuring of the operation. In place of many people with highly specialized jobs, Citibank created a leaner structure in which individual staff handled nearly all aspects of a customer's letter of credit relationship. Nearly half the jobs were eliminated, but a major improvement occurred in customer and staff satisfaction.

Electronic mail and conferencing are other examples of applications with major organizational impacts. A number of organizations use electronic mail and conferencing to support telecommuting (work-at-home) options for handicapped workers, nursing mothers and others.

To date, strategic computerization has mostly involved mainframes. The greatest impact of the micro has not been on work actually accomplished; rather, this impact has been in the form of educating a rapidly growing cadre of managers about the jargon and possibilities of the technology.

With the 16-bit and 32-bit micros, multitasking operating systems, cheap hard-disk storage and ridiculously cheap memory, micros are poised to move beyond task or personal applications to fit into newly designed computerized processes and organizations.

Personal computers constitute an enabling process that puts computers into the hands of professionals and managers, not just clerks. These machines will lead to an explosion in recordkeeping and, more important, to the extraction of information from records. They will lead to a relaxation of the time and space constraints on work, saving time and improving collaboration (while also creating situations where it is much more difficult to escape from work).

The emergence of micro-based products is now more than theory. Products like Symphony, Framework and others integrate personal tasks; local-area networks and multitasking operating systems are opening up micros for organizational process applications. One such process — is the handling of customer or constituent requests and complaints. How good is an organization's performance when the customer is actually paying attention?

Order entry systems have dealt with part of the problem of dealing with customers. Today, however, customer interaction requires more subtle transactions than those allowed in order entry systems. Citizens who want bus schedules or customers who complain about shoddy products are forming lasting impressions of an organization's responsiveness. Microcomputer products are now emerging to assist those who handle these situations.

Process-oriented applications are harder to implement in terms of organizational behavior, but they offer high paybacks for success, as in the Citibank example. The tough part is that jobs may be substantially restructured, changing social relations on the job. When such changes are contemplated, one important consideration is whether a production line view or an information age view will be taken.

The production line view has as its basis the belief that people possess limited capabilities. Work needs to be highly structured and simplified by means of strict routines and sequences. Uncertainty is something to be removed and coordination among individuals is to be achieved through predefined procedures that limit choice.

In contrast, the information age view — which is far less prevalent in most computerization efforts — believes the individual possesses expandable capabilities, with limits that can largely be overcome if the choice process is assisted by good computerized data bases and processing. The goal is to improve the outcomes of complex choices, not to eliminate them via routine. The information age view tries to create an office of the future, not to mimic the factory of the past.

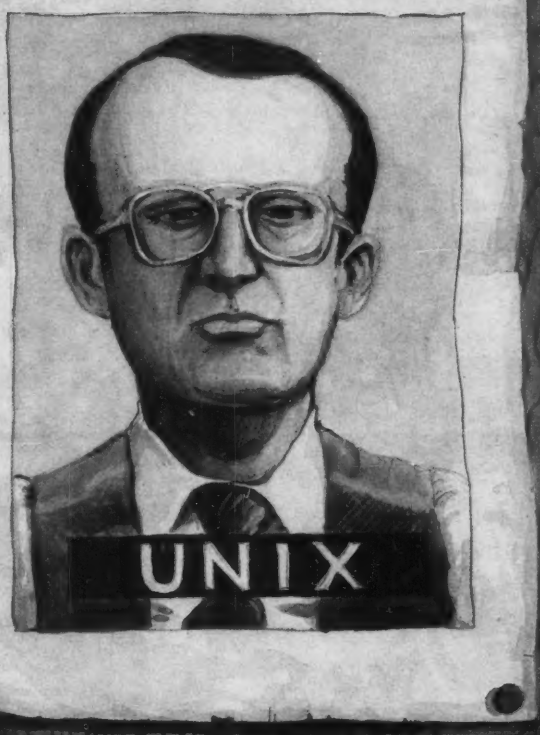
The significance of trends is still uncertain. Some organizations, however, are clearly trying to use OA to create production line offices. They will probably find they have made a mistake; such a decision will greatly limit the potential of OA. OA is edging beyond the easy territory of task-oriented productivity tools to job-oriented software and further into experimental applications in the arena of organizational process and change. This move has several implications for management:

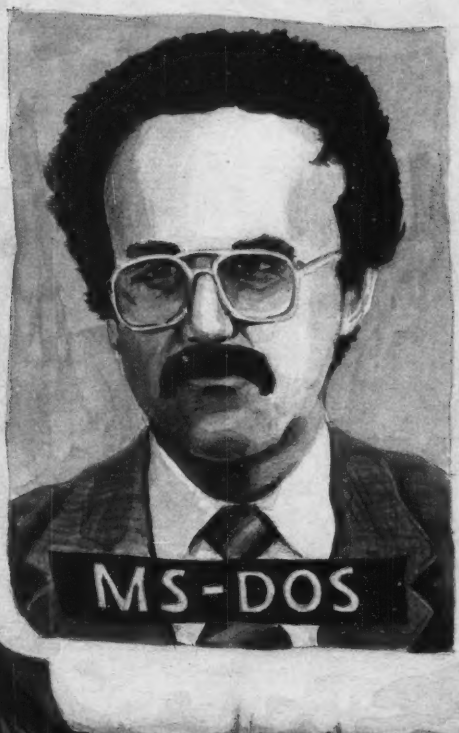
- Individual and enabling technologies are still by and large WP and communications. This is not to say that an organization should skip the task-oriented productivity tool stage and jump right into organizational process. Rather, it implies that something big and important (and tough to handle) lies beyond the integrated spreadsheet and word processor.
- It is important to actively seek out the opportunities for redefinition of organizational processes and competitive position. The right applications will not evolve of themselves from simple task or job-oriented efficiencies. As with the Citibank example, the entire organization may well have to be rethought and recast. This is not just an information systems and OA management problem — it is a senior management problem.
- It will be impossible to get things right the first time or for information systems and OA management to handle the situation alone. The problems involved are simply too complex. Only those who have lived with the new structure for a while can have any idea what "right" may really mean. Plans must allow for iterative adaptation and evolution.
- Instead of putting 25% of a major new systems development effort into paper-based design studies, an organization would be wise to invest in prototype systems for the same resources and gain much greater returns in the form of real-world experience. Pilot projects should be included — not as research and development ventures, but as a regular phase of the systems design process.
- A key element will be the education of senior and middle management. This statement has been made many times before, but it cannot be stresed too much that education can be the most powerful and cost-effective change agent an organization has.
- Consistency and control are not the watchwords of the topic under discussion here. The next phase of OA is going to involve a lot of stumbling around. A batting average of .333 should be considered good. Active participation and involvement of user management will be essential, and unless top management is highly committed and directly involved, the process will be even riskier.
- This means that the focus of information systems and OA attention should go beyond control over the communications infrastructure and hardware/software acquisition. Room for experimentation must exist at the same time that efficient implementation proceeds with the better understood and older technologies. The behavioral part will be more important than the technical part, so management must be both alerted and involved. With the uncertainties and political forces that will be unleashed, an organization will find that being lucky will be just as important as being good.

After the easy stuff of word processing and spreadsheets, one of every three user managers will be directly involved in a significant office automation project over the next five years. Chances for success will be increased via a strategy of aggressive incrementalism. The big hits will come, not through personal productivity tools, but rather through applications that focus on individual and organizational processes. OA

Dacey heads Dacey and Associates, a Cambridge, Mass.-based management consulting firm consulting on a variety of areas, including information systems and OA planning and implementation.

Mechling is a principal in Selkirk Associates, a management consulting and software firm in Boston. He also teaches information systems at Harvard University and at Brandeis University.





WANTED:

THE BEST OPERATING SYSTEM

BY JOHN VACCA

Tracking down an operating system suitable for the latest generation of microprocessors in the office automation environment is a challenge that even the arch sleuth Hercule Poirot might find difficult.

This quest for the perfect OA operating system has prompted an all too eager search for an existing industry-standard system for use on the latest microprocessor-based systems. Three operating sys-

tems will be examined here, in terms of their capabilities and effects on microprocessors:

- Unix, the highly acclaimed system originally developed at Bell Laboratories.
- MP/M, Digital Research, Inc.'s multitasking operating system.
- MS-DOS, Microsoft, Inc.'s single-user operating system.

Each system fits into a particular category, and each is most likely to appear on a machine in use for a certain class of applications. Of course, a certain amount of overlap does occur; when this happens, considerations of machine price/performance will probably outweigh the factors determining the choice of the operating system.

Applications software developed for Unix on one machine can be moved with minimum effort to a new implementation.

Nevertheless, the facilities provided by an operating system are becoming increasingly more vital to the general performance and usability of a microcomputer system. The operating system debate seems likely to continue for some time.

Unix, the first of the three systems to be considered here, is essentially a general-purpose, multiuser operating system — it can support a number of concurrent terminals, the users of which may be involved in identical tasks. Unix is suitable for use on a wide range of minicomputer- and microcomputer-based systems.

Unix can hardly be described as new; its original development took place during 1969 and 1970 at the Bell Laboratories Computer Science Research Center in Murray Hill, N.J. However, Unix has become widely available only with the comparatively recent advent of the 16-bit microprocessor; approximately 80 or 90 different computer systems already offer Unix as the operating system. Industry predictions of its growth in the software marketplace are, to say the least, spectacular.

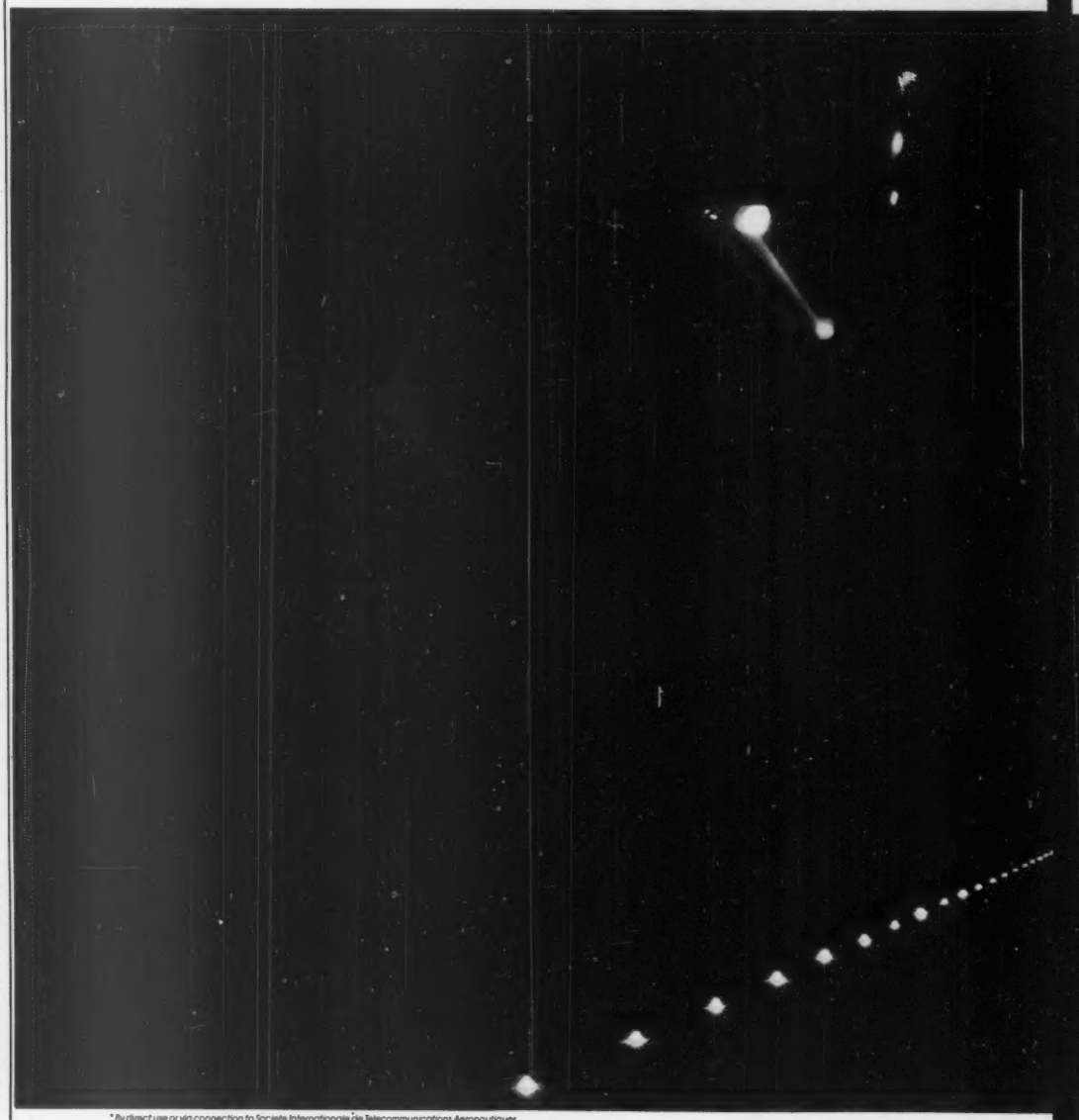
A description of the technical attributes of Unix will follow in more detail, but first it is worth examining some of its advantages and disadvantages and some reasons for its popularity.

First, Unix' portability makes it one of the first choices for an operating system for a new microprocessor in the OA environment. A second immediate benefit is that applications software developed for Unix on one machine can be moved with minimum effort to a new implementation. This option is clearly attractive both to software product developers (it gives them a much larger marketplace for their product) and to users (they need not fear they are being locked into a particular machine or manufacturer).

Perhaps the other major reason for Unix' popularity is the wealth of programming tools it provides. Unix offers the programmer a particularly rich and productive environment in which to develop software. The high regard in which programmers hold Unix is ensured by the speed with which new programs can be developed, and the operating system facilities that enable new tools to be combined with existing ones.

If Unix is so popular, does that mean there's nothing wrong with it? No. To begin with, there is a major problem with teach-

How many of the world's 15 largest airlines are



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All of them.

Motorola is a world leader in advanced electronics for memory, logic and voice and data communications.

ing Unix, and that problem can be traced directly to the operating system's origins. Because Unix began as a programming development tool, it was written by programmers for programmers. Very little documentation is available for the average user community. The result is a user-hostile environment, where English is a foreign language and commands are in code. In a sense, given its notorious user-hostile nature, Unix makes no contribution at all in software ergonomics and thus may be viewed as a throwback.

Unix also suffers from a number of other problems, including the following:

- When files grow larger than 5K bytes, the file system and I/O facilities perform poorly.
- A full-screen editor is made to appear to be a major advance by a built-in teletype-oriented slant.
- The user is kept in the dark by an unintelligible and inconsistent user interface that eagerly responds to common typing errors with massive file system damage.

A final problem that should be mentioned is that data management services are not offered by the Unix system.

It is the responsibility of each user to create, maintain and interpret even the most elementary data structures. The rapid growth of data base systems for Unix does not indicate a rise in its popularity; rather, that growth represents a major hole in Unix and one that needs to be filled.

These are some of the advantages and disadvantages of Unix; it is now time to describe some of its technical attributes: multiuser capability; multitask capability; user interface; device and file access; and file system.

Unix can be described as a multiuser system designed for multiterminal access. It provides facilities for sharing resources (such as CPU, disk and space) among users, with protection mechanisms to ensure the integrity of each user's application and data.

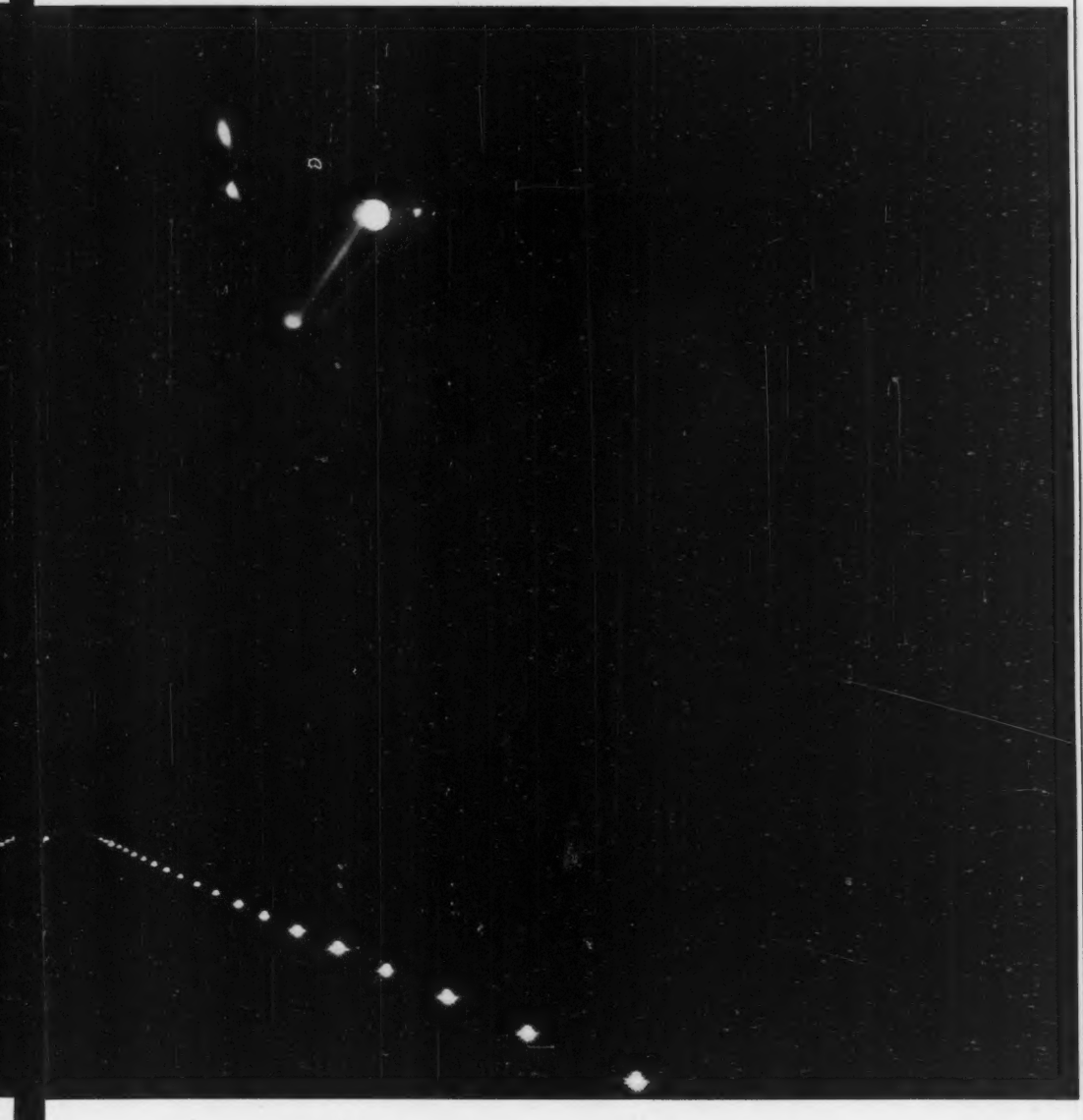
Given its notorious user-hostile nature, Unix makes no contribution at all in software ergonomics and thus may be viewed as a throwback.

Each Unix user may also invoke simultaneously a number of different programs (multitasking). Some programs may be relegated to run in the background, with no direct user interaction, while the terminal user interacts directly with another application.

Unlike interfaces found in some other operating systems, the Unix user interface does not form part of the operating system itself. The Unix command interpreter (called the shell) may be replaced by some other program without any need to alter the operating system. For example, one user can log into the system and use the standard shell, while another could log in and use only a word processing package as the standard interface with the system.

Unix was also one of the very first systems to offer device-independent I/O. The system provides an interface that allows a programmer to develop applications that make use of any physical device — a line printer, for example — or disk file in an interchangeable fashion. The program does not need to know anything about the characteristics of its input or output data streams. This concept extends to the ability to pass data directly between concur-

served by our data communications systems?



MOTOROLA / codex

rently executing programs, each program treating the other as if it were an ordinary disk file.

Finally, the Unix file system has a hierarchical structure: a "tree" in which the "leaves" are data files and the "branches" are arbitrarily extensible. This allows users to structure their data files in a manner that replicates their pattern of work; for example, various chapters of a book can be collected into one directory, with other books in the series each occupying a separate directory. Each user is able to extend the hierarchy to reflect his own patterns of work.

The second of the three operating systems being examined for the OA environment is Digital Research's MP/M. MP/M (multitasking program/microcomputer) is the successor to CP/M (control program/microcomputer), an operating system developed for the Zilog, Inc. Z80 and Intel Corp. 8080-based microprocessors.

Digital Research has set about the task of providing an operating system family that would make it easy to move existing 8-bit software. This family currently has three members: CP/M, Concurrent CP/M and MP/M. We will examine only the most complex member of the family, MP/M, with reference to the CP/M system.

As was done earlier with Unix, MP/M will now be discussed in relation to the following technical attributes: multiuser capability; multitask capability; user interface; device and file access; and file system.

MP/M provides the facilities required to enable multiuser operation. Because of the limitations of the hardware on which it is implemented, however, MP/M does not provide a fully secure environment; it is possible for an erroneous user program to crash the complete system.

MP/M also provides facilities to enable multitask operation. The system uses a strict priority scheduling algorithm, and it is possible to configure particular MP/M variants that are suitable for real-time operations.

The standard command interface of MP/M is also very similar to CP/M. By using the mechanism of resident system processes, it is possible to introduce a specially configured user interface suitable for a particular application.

MP/M device and file access is also similar to CP/M; it includes facilities for file and record locking.

Finally, MP/M enables the use of up to 16 logical disks, which may be configured on either floppy or hard disks. Within each logical disk the directory may be shared among as many as 16 users, with the user identity (a number in the range 0 to 15) determining the ownership of a particular file.

As with CP/M, the file system structure is still a single-level hierarchy with no means of adding to this logical structure.

In August 1981, with the launch of the IBM Personal Computer, IBM announced its entry into the microcomputer market. The operating system developed for the IBM Personal Computer — Microsoft's MS-DOS, which IBM relabeled PC-DOS — was the third system for the OA environment.

At the time of its release with the Personal Computer, MS-DOS was very similar in capability to Digital Research's CP/M operating system. Although the two systems differ in detail and in internal organization, MS-DOS and CP/M offer very similar user interfaces.

It seems unlikely that MS-DOS would have had a significant market impact had it not been selected as the primary operating system for the IBM Personal Computer; with that seal of approval, MS-DOS has taken a rapid and firm grasp of the 16-bit personal computer market.

This discussion centers around the following technical attributes of MS-DOS: single-user capability; single-task capability; user interface; device and file access; implementation; and file system.

MS-DOS is intended as a single-user personal computer operating system. However, Microsoft regards MS-DOS as the low end of their operating system range. Currently, MS-DOS is a single-task system. A pseudo-multitask environment is apparently due to the inclusion of a background print spooler — Simultaneous Peripheral Operation On Line, or the use of auxiliary storage when transferring data from the processor to its peripherals — which runs concurrently with a user program.

In addition, the standard command interface to MS-DOS will be familiar to any CP/M user; the enhancements included in MS-DOS introduce some Unix-style facilities into a command interpreter (a translator that intermingles translation and execution).

MS-DOS has also introduced device and file I/O mechanisms modeled on Unix. User programs are then able to carry out device-independent I/O; and the file system structure offers a hierarchical view of files, with naming conventions drawn from the Unix model. Following the method used originally by CP/M, MS-DOS is usually configured for a particular hardware environment. In addition, the standard command interpreter is also replaceable by the user.

Finally, the structure of the MS-DOS file system is also based on Microsoft's Unix-derived product. The hierarchy of directories and data files is extensible in a manner similar to that of the Unix file system, and the naming convention for files is also used by Unix.

One subtle difference does exist, however. Unix names all files relative to a root directory, which is tied to a particular physical disk unit. MS-DOS has the equivalent of a root directory on each physical unit, and the unit has to be selected by the user. The difference can be traced to the type of hardware on which each operating system runs; Unix expects to have permanently mounted hard-disk units. MS-DOS is very likely to run only in a floppy disk environment, and the user is therefore more likely to be changing disks. Such an environment makes it difficult to insist upon a particular disk being permanently available as the root of the file system tree.

It seems unlikely that MS-DOS would have had a significant market impact had it not been selected as the primary operating system for the IBM Personal Computer. With that seal of approval, MS-DOS took a rapid and firm grasp of the 16-bit personal computer market.

Three operating systems have been presented here in order to examine current and particular areas of commercial activity that will affect the OA environment. The Unix system and its various derivatives are appearing in increasing numbers. MS-DOS has been adopted, almost unilaterally, as a result of the introduction of IBM's Personal Computer. MP/M — the more complex member of Digital Research's operating system family — allows CP/M users to upgrade to a more powerful processor (Intel Corp.'s 8086).

Of course, there are other systems that have not been mentioned here; in general, these operating systems are built to run a particular class of application program very efficiently. As such, they are rather specialized; their interaction is such that it is generally not obvious where the operating system stops and the application program begins.

Other developments have taken place that will also have an effect on operating systems. The cost of disk storage has continued its downward spiral; terminals have appeared with relatively new, high-resolution displays capable of providing reasonable quality line drawings as well as text. It seems likely that personal computers with over 60M bytes of disk storage capacity and high-resolution color displays will be available for less than $5,000 within the next two years. The operating systems in such machines must be highly sophisticated in order to make the hardware capability easily available to the user. Unix is currently closest to the requirement, but is certainly not ideal. Considerable research activity is concentrated in this area, especially at the Xerox Parc establishment, Bell Laboratories and Carnegie Mellon University, which are well to the forefront. In fact, the first actual product of this type was the Xerox 8010 Star, announced in 1981.

Associated with all these developments are the parallel activities in network development. Most major countries now operate one or more public data networks and local-area network development activity is highly advanced. Agreement will probably be reached on a small number of international standards for local-area and wide-area networking within the next year, and it seems likely that the first single-chip local-area net interfaces will also be introduced during that time period.

These developments should lead to the announcement of many more products based upon the notion of personal and shared computer resources distributed around a network. Again, the operating system used to connect a machine to the network must be capable of providing simple and efficient access to the resources of the network.

So what will become of the 8-bit micro and — by implication — its standard operating system, CP/M? Clearly, an enormous installed base of such machines still has a useful service to perform. Nevertheless, simply looking through advertising brochures for computers can easily demonstrate that the number of new 8-bit-based products is declining rapidly in the face of the largely IBM-inspired wave of products for 16-bit micros.

It seems safe to assume that new 8-bit based machines or CP/M-based products will be reduced to a trickle within a year. The companies that made their first fortune out of the 8-bit micro will be looking for their second in the 16-bit market. New companies entering the market are unlikely to accord much emphasis to the 8-bit system in their product plans.

OA

Vacca is a free-lance writer and consultant based in Topeka, Kan.

WHO'S MINDING THE STORE?

BY JEFFREY COGEN

As waves of micros pour into organizations that once accepted them only grudgingly, a number of large companies are setting up in-house computer stores to help configure or even purchase systems for their users. These stores are springing up because they fill several needs:

• They facilitate the purchasing of micros, software, dumb terminals, and computer peripherals.

• They reduce the cost — in both money and aggravation — of disorganized purchasing.

• They help implement corporate micro strategy.

Although they are not open to the public and cannot really be compared to commercial computer stores, these in-house stores do what all good retailers do: try to give consumers the best products and service for the money. In-house stores provide a more complete service to their customers than any corner computer store could. They are nonprofit and are staffed by salesmen and consultants familiar with the users' business and attuned to the kind of support corporate clients need. The stores play a part in implementing company office automation strategy by helping employees purchase only the equipment that fits the strategy.

Whether called in-house stores, office technology centers, micro centers or information centers, these facilities act as internal clearinghouses for users interested in microcomputing. "Before the store, there was little in-house help for users when it came to personal computers," said Ricci Anderson, vice-president of corporate

systems at Chase Manhattan Bank in New York, which opened a computer store in January.

Most stores have a demonstration room where users can try out different hardware and software. Staff is usually provided to answer questions about a product and to work with users to help configure a system designed for their business applications. Most stores provide some sort of training, which may be a user-driven tutorial on a particular software package or a structured introductory course in personal computing.

The advantages vary for the prospective buyers, users and the company as a whole. Some stores have streamlined the process of purchasing micros, helping the buyer cost-justify and also cutting down on paperwork and turnaround time. Some have special Help lines for users having trouble running a certain program. A number provide in-house maintenance and negotiate volume-purchasing agreements with vendors. Some create hardware and software standards after analyzing the products on the market.

If any two major themes run through the phenomenon of in-house stores, they are education and standardization. Stores give users an in-house area to familiarize themselves with the technology, a place where they don't have to be wary of flashy salesmen. While providing this needed service to employees, the in-house store also acts to control the sometimes random influx of computer equipment into a company.

In some firms, employees are required to channel acquisitions through the store, which limits purchases strictly to the equipment on display. Even in companies where orders do not have to be approved by the store, novice users are apt to order something on display because those models tend to be the only computers they have used.

"There are tremendous advantages, from the corporate viewpoint, when you have a center to recommend micros," said Dr. Harold Kinne, of Future Computing in Richardson, Texas. "You don't end up having all the little brands of computers and, in some cases, inadequate software, being used for business purposes."

In the early days of personal computing, before IBM created a de facto standard with its Personal Computer, the idea of a store as standardizer may have reduced the number of DP manager migraines. Now that IBM holds such a large share of the market, a store's action as a standardizer of technology, although still important, is less pronounced. "The IBM standard has made our job easier," said Danielle Barr, vice-president of office systems at the Bank of New England in Boston, which created a micro center about two years ago.

What the stores do best is help employees — mainly professionals — who could use computer equipment in their work, to acquire equipment that is best for both company and user. "We talk to them about their applications and what they already have within their own departments," Anderson said. "Then we help them configure what it is they will need."

After a configuration has been drawn up, the user will take the suggestion to his department for cost justification — if that is company policy — and then send it on to whatever department purchases the equipment. This is usually the purchasing department, but in a number of companies, the computer store will actually handle acquisitions.

"At first, people saw control as prevention," Barr said. The bank's Micro Center — which must approve all purchases — displays the IBM Personal Computer (their general standard); the Wang Laboratories, Inc. Professional Computer and OIS word processors; and Apple Computer, Inc.'s Apple II, Apple III, Lisa and Macintosh. But control fosters support, and support benefits users. "We don't want to involve users before we know how a product works.Most people realize they are not computer experts. They let us do the job," Barr said.

"No one is capable of supporting all hardware and software," said Marty Butler, director of the Boston-based Microcomputer Managers Association. "But with standardization, there is support. Users really don't have a choice of equipment now. If a company hasn't already come out and said there is a standard, a de facto standard is already in place."

According to Butler, in-house stores are a positive step for any company with as few as 25 or 30 micros. Future Computing's Kinne said such stores are quickly becoming prevalent on the Fortune 500 scene and "in terms of maintaining control and ensuring the effective use of computers, they are almost essential."

Although some stores appear to give users a relatively wide choice of equipment — the Chase Manhattan Computer Store, for example, offers hardware from five vendors — they make sure that whatever is displayed will be compatible with the corporate computer and network strategy.

"Everything that we recommend is compatible with the company's automation strategy because eventually, personal computers will all tie in to mainframes," said Sally Huns, assistant vice-president in OA planning at Manufacturers Hanover Trust in New York. "It is important that we keep our focus on that overall goal."

If any two major themes run through the phenomenon of in-house stores, they are education and standardization. Stores give users an in-house area to familiarize themselves with the technology, a place where they don't have to be wary of flashy salesmen. The store also acts to control the influx of computer equipment into a company.

The Office Technology Group at Manufacturers Hanover has grown in two years from a staff of 10 to a staff of 27 and has recently opened a second center, aimed primarily to serve professionals.

Though most users are steered to the store as a place to have their questions answered, they may not be required to use the store for drawing up a configuration or for acquiring the equipment. A price is paid for such independence, however. "If you don't go through us," said Jesper Mackeprang, manager of American Can's Greenwich, Conn., Support Center, "there is no guarantee you will get any support or any help at all in setting up the system. We have had good luck getting users to go through us."

"I like to look at it as this is the equipment that the computer store is suggesting," said Fred Winograd, a vice-president at Chase Manhattan. "Part of what we are is a living standard. We are continually assessing products. We listen to the outside world and the inside world to see if we are recommending the right products."

Some stores are affiliated with information centers; others are not. American Can's Support Center integrates mainframe VM/CMS, micro and OA technologies. "We have all the expertise in one place. We can give a more qualified opinion as to whether you should use time-sharing, personal computers or office automation equipment such as Displaywriters," Mackeprang said.

At American Can's Support Center demonstration room, consultants sit down with employees and go through applications on a one-on-one basis. Mackeprang said, however, that people don't seem to be concerned much about testing equipment before they buy it. "What we do find is that they will use our facilities to learn how to use the equipment," he said.

Many of the stores function more as training facilities than as stores in the usual sense of the word. "The in-house computer store replaces the retail store as a centralized, easily accessible place where users can go to bone up on the technology," Huns said.

Manufacturers Hanover, for example, relies strongly on self-teaching aids, such as video disks. "Many people are able to teach themselves with user-driven tutorials, so they don't need to take time off from work," said Peter Hull, assistant manager at Manufacturers Hanover.

Introductory personal computing classes are standard fare at most centers. Special demonstrations and guest talks draw additional employees into the store. In Chase Manhattan's case, the number of employees walking into the store daily was estimated at 30. The facility receives 60 to 75 calls on the Help line each day on various support questions.

For large, decentralized corporate giants, a computer store with a catalog may be the way to go because many employees may not have access to the demonstration room. Hughes Aircraft Co.'s Data Systems Products Department, in El Segundo, Calif., publishes a catalog that guides users through the justification and acquisition process. The guide includes descriptions and black-and-white photos of available equipment and provides users with order forms. The catalog has drastically reduced the number of phone calls the department receives, according to Rhonda Carlson, DP resource coordinator.

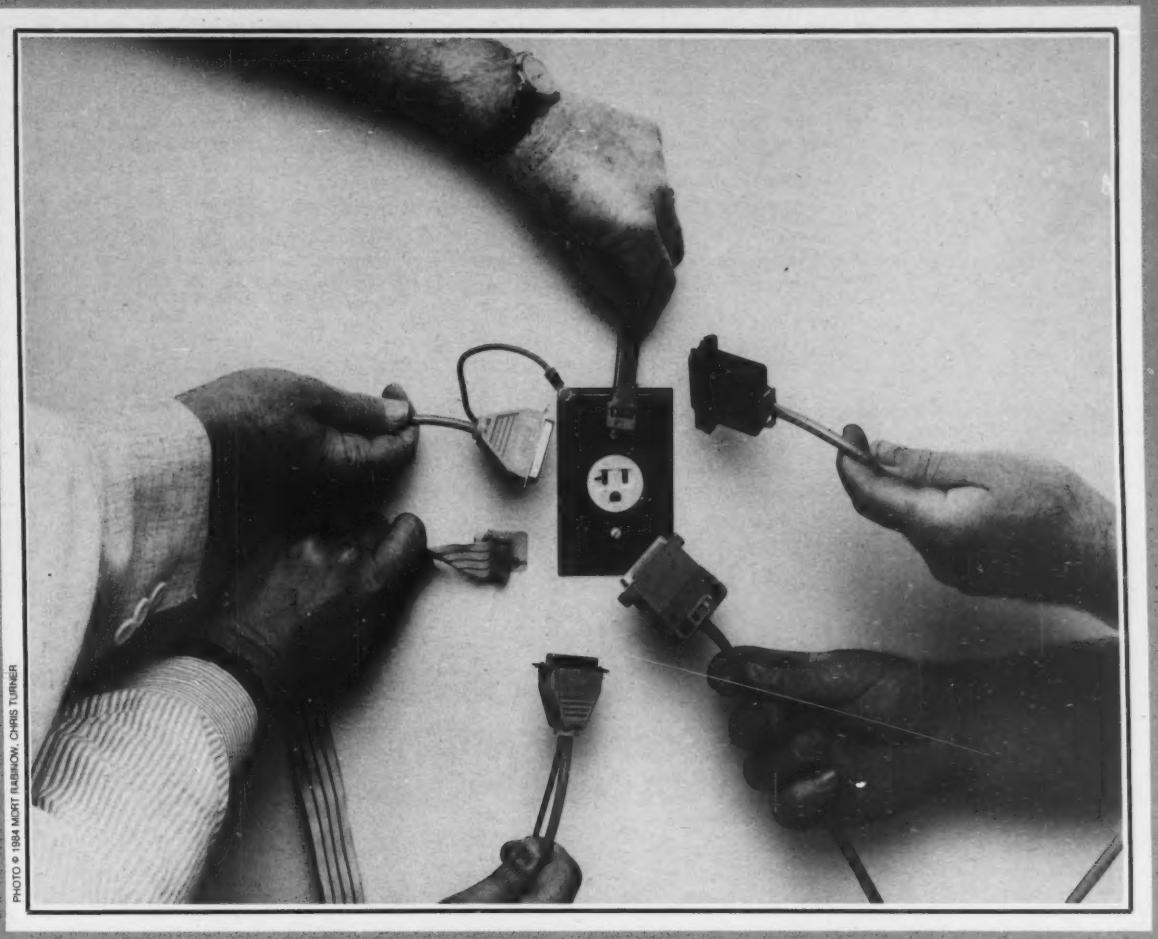
"We deal with the vendors, so the users don't have to," Carlson said. "Centralization saves the company money and makes it easier for users to get equipment." Because equipment is prescrolled (continually on order from vendors and delivered in batches when demand builds up) what used to be at least a three-month wait now usually takes about one month, she said.

Some companies avoid using the word *store* for fear of conjuring up images of former used car salesmen dumping computers on unwary employees. Most stores, however, are empowered to provide users active support, up to date information and suggestions for integrating computer technologies into the business.

According to Huns, the Office Technology Center at Manufacturers Hanover was created in response to a new bank directive to spur interest in personal computers and to bring the technology closer to the professional.

"We had been reactive, not proactive, in moving the technology forward," Huns said. "We are now the promoters, marketers and supporters. We've brought the technology right into the user's area of business. We are not hidden away anymore." OA

Cogen is a free-lance writer and an editorial intern at Computerworld OA.



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A PLUG FOR COMPATIBILITY

BY SANDRA CROWLEY

It used to be that two people worried about whether they were compatible. They wanted to "talk the same language." Now they worry about whether their IBM Personal Computers and office automation equipment are compatible.

Compatibility in the OA industry refers to the ability of one product to be used in harmony with another. With so many different models of OA products in the marketplace, consumers are confused about what's worthwhile hooking up to what. A framework is needed to approach the compatibility issue in an orderly fashion.

The popularity of the IBM PC, of course, has forced the compatibility issue. Countless numbers of PCs are making their way into corporate offices and onto managers' desks. It's those PCs that they want to be compatible with their OA equipment.

In today's marketplace, the purchase of almost any piece of OA equipment — not only personal computers — can hinge on answers to such questions as: "Is it compatible with IBM?" or, "Can the system access data from the IBM mainframe?"

More and more often, the answer is "Yes." IBM continues to set industry standards. Other vendors continue to fall into line. Experts predict the IBM PC and PC-compatible systems will account for 60% to 70% of personal computer shipments in 1984.

PCs aren't the only IBM success story. The first few months of this year, leading OA suppliers such as Digital Equipment Corp., Data General Corp., CPT Corp. and Sperry Corp. joined the growing ranks of vendors offering products that can link up with a 3270 (Systems Network Architecture/Systems Data Link Control) network.

(While IBM strives to enforce its brand of uniformity, others seek to open the door to vendors that aren't IBM-compatible; Digital Research, Inc.'s new product, Concurrent DOS, combines CP/M 86, MP/M 86 and MS-DOS capabilities into one package.)

Still, what was once an information Tower of Babel is starting to make sense. As IBM compatibility becomes more and more common, however, consumers will turn to other compatibility issues to differentiate among products. There is more to compatibility than IBM.

Consumers often think they should look for perfect compatibility. They want everything to talk to everything else in a single network, and they want everything to understand everything else. Would it be realistic to assume that Americans from the South could go to Germany and automatically speak German in perfect dialect, no matter what region they visited? Could they hope to have their accents received without confusion? Not really.

The first step in compatibility is the transfer of information. You have to be able to transfer information before you can share it. After it's transferred, you have to decide how much further you want to go — what exactly do you want to share?

Before compatibility is even addressed, one fundamental question should be posed: "What are you trying to accomplish?" Well thought-out answers to this question should precede the search for OA equipment and inform any decisions made.

When talking to OA vendors, you should discuss the problems you are trying solve or the automation requirements of your office.

You may be trying to decrease the cost of doing business. You may want a specific job accomplished; in this case, decisions should revolve around an application, which might point you to some of the smaller companies that have carved out a market niche by being application-oriented. You may be looking for an efficient way to integrate the pieces already installed in a local-area network.

Finally, if you're a start-up business, you may want to look toward the future; if so, your needs are for a small system on which you can build — piece by piece. Each situation requires a different solution.

Experienced OA vendors understand the validity of this approach. They sell you solutions, not systems. There is enough versatility and flexibility in OA systems today that you can find ones that can be adapted to your office. Furthermore, certain OA vendors sell an electronic emulation of the office through a black-and-white screen (positive presentation), and electronic paper, calendars, in-boxes, out-boxes, mail slots, trash cans and more.

Discuss with the OA vendor the level of compatibility necessary and the kinds of compatibility suited to your needs. (You can't have it all — yet.)

For example, you may require communications compatibility in order to send information from one department to another or from one office to another, or you may require media compatibility from one system to another so information can be shared on disk.

Remember, the first step in compatibility is the transfer of information. You have to be able to transfer information before you can share it. After it's transferred, you have to decide how much further you want to go — what exactly do you want to share? How much access do you want people to have to the information?

Again, the root of the quest remains: What are you trying to accomplish?

After needs have been determined, the consumer should have a framework that functions as a guide during the product search. The current compatibility dialog

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revolves around two general issues, which form this framework:

• **Compatibility within product line.** This issue addresses the areas of hardware, software, media and functional compatibility as they apply to a single vendor's product line.

For instance, will the programs that work on one model of a brand of computers work without change on newer or larger models of that brand?

Obsolescence is one concern here. So is training. Those who want to make their training cost-effective may not want to train 47 people on four different types of systems.

• **Compatibility between product lines.** This addresses the issue of the "integrated office." For example, if an office has a phototypesetter, a personal computer and a word processor — all from different vendors — will it be possible to transfer, share and then print information?

Or, can a number of workstations from different vendors be hooked into a single network?

The consumer in search of compatibility in OA products is really trying to preserve the company's information and protect its investment. Why buy a product today when next year the same vendor will come out with a new product that will not be compatible? If you generated a lot of information in 1978, you want to conserve it by 1988. Equipment is replaceable; information isn't.

The easiest and most direct way to save words and money is through upward media compatibility. Office managers who bought IBM MT/ST model typewriters in the mid-1960s know the frustration of media incompatibility within a single vendor's product line. The medium used on the MT/ST was a magnetic tape cartridge.

When the IBM mag-card system was introduced a few years later, there was no way to share data between the two media. Any "upgrading" involved throwing out one system and bringing in the other.

The same problem exists today within the product lines of vendors that offer one system with 8-inch floppy disks, another with 5¼-inch disks and yet another with 3½-inch disks. Compatibility can be obtained only through a system server or a media extension device. This represent a further investment, and that investment brings no guarantee for tomorrow. Some vendors' products, such as Wang Laboratories, Inc.'s WPS and OIS, although not media-compatible, can share information through communications.

There are, however, vendors whose disks are all directly compatible and can be read by the latest product additions.

Media compatibility is not the only question. Always consider hardware compatibility within a product line. Increased memory storage, enhanced features and new peripherals are among the future additions you may want to make to your OA system. Will the system you buy today be compatible with those additions? Or will you, too, buy a system today, only to end up throwing it out and replacing it with another a few years down the road?

Some vendors' printers will work on all their systems — old and new. Other vendors don't feature this hardware compatibility. A Wang image printer, for example, won't work on some of their smaller systems. The IBM System 6 can use an ink jet printer, but the only way the IBM Displaywriter supports the ink-jet printer is by going through communications or to cards.

Finally, consumers should look for a vendor intent on maintaining functional compatibility within a product line. Do all the systems operate in the same manner? If so, an operator trained on one system can work on another without wasting company time on retraining. Productivity remains high when keystrokes are consistent from system to system.

The NBI, Inc. System One with the 4000 workstation and graphics system appears to be an example of differing operator interfaces. The 4000 uses only 8-inch disks and offers only single-screen text processing. The graphic system uses 5¼-inch disks, but provides windowing and graphics processing.

Consumers with plans for future growth would be well-advised to look for an OA vendor that has a history of maintaining compatibility within its own product line — from entry level all the way to the top. The vendor should be as intent as you are on protecting an installed based of equipment.

It's nearly impossible today to find a company that does not already have a number of vendors' products installed. How much of what you already own will have to be thrown out because your new system is not compatible with it? Always consider whether one company's products drive another company's products.

This brings up the issue of compatibility as it is most commonly discussed: in terms of vendor-to-vendor product relationships. The ideal "integrated office" for the consumer would be one in which every OA product is able to "talk" to every other OA product, and all of them fully understand each other.

One could conceivably have a DEC All-In-1 for voice mail, a Xerox Corp. 860 for data files, a CPT Corp. 8525 for word processing, an IBM PC for spreadsheets and an Apple Computer, Inc. Macintosh to take home at night. With complete format transferability, all could work together on a single network.

Unfortunately for the consumer, things don't work that way. Each OA supplier has a different way of formatting the codes used to transmit information between computers (or between a computer and its peripherals). Because those suppliers want to protect their own investments, it's unlikely that vendor-to-vendor compatibility will ever reach the stage considered ideal by consumers. (Industry speculation even has it that IBM, as a means of impeding the efforts of its imitators, is already considering a reversal of its new open philosophy regarding the IBM PC.)

However, a realistic goal is to be able to share some files and share some information between systems from different vendors — in other words, compatibility through communications. This has given birth to a new industry — protocol conversion. At least a half-dozen vendors are already in the business. The bad news for the consumer is that these vendors expect to do perhaps as much as $100 million worth of business in 1984.

The good news for the consumer is that some vendors are doing their best to ensure that their products are, to a significant degree, compatible with the rest of the world. They're achieving more versatile communications through usable conversion tables: two tables (one for reception, one for transmission) that decipher the format differences between dissimilar devices.

Built into the program disk, these translation tables allow a microcomputer or word processor to communicate with a wide variety of OA devices, including mainframe computers, typesetters, optical character recognition devices and personal computers, as well as other microcomputers and WP systems. Regardless of your business, this type of compatibility is essential for survival in today's business world — and will be even more so tomorrow.

In sum, don't expect media compatibility from one vendor to another. It can be done, but it's very expensive. Expect compatibility through communications.

The consumer in search of compatibility is really trying to preserve the company's information and protect its investment. If you generated a lot of information in 1978, you want to conserve it by 1988. Equipment is replaceable; information isn't.

As you search for the proper solution to your particular OA needs, another of your company's assets that should not be overlooked is the people who work there. How much space will the new system occupy? How compatible will the new system be with them? If they cannot quickly adapt, a system purchased for the purpose of increasing productivity could easily produce just the opposite effect.

The issue of functional compatibility can be understood through questions about operator interface. How easy (or difficult) will it be for your workers to learn how to use the new system? Will you purchase the lowest-priced system to save money, only to turn around and spend that money on additional operator training? The answers to these questions may depend on how different your new OA system is from what you already have. Systems that most resemble the standard typewriter are often the most user-friendly. Features such as a fixed typing line and black-on-white display can make a new system much more compatible with your existing office place — and with the people who work there.

In the final analysis, the OA system you purchase should be the one that is most compatible with your needs.

Consider the type of work done in your office, and the manner in which it's now being done. If you're looking for a new OA system, chances are you're having problems with your existing system: productivity problems, storage or access problems or communication problems. You want a system that can solve those problems — without creating new ones.

The system that can best do that is a system that is consistent with your existing office environment — and its requirements. You want a system that can communicate with a variety of office equipment and people, and you want your system to be easily upgradeable — so it can grow as you grow. Such a system will be truly compatible, in every sense. OA

Crowley is a marketing manager at CPT Corp., located in Minneapolis, Minn.

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OA NEWS

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committee has a hodgepodge of 75 personal computers from IBM, Eagle Computer, Inc. and Hewlett-Packard Co. There are also a large number of lap-size Radio Shack Corp.'s Model 100s for the field forces. The RNC itself — which supports not only the presidential reelection efforts but also Republican election campaigns around the country — employs a DEC System 20 Model 2060 mainframe along with a recently acquired Wang Laboratories, Inc. VS system. The DEC system supports 60 to 70 users handling DP, large political data bases, electronic mail and opposition research; the VS system is used primarily for word processing.

The president's reelection committee is also making invaluable use of its Political Information Systems (Pins) data base, for both daily and long-range strategic planning during the election. An earlier version of Pins was used with positive results during the 1980 election, and a more sophisticated system was unveiled for 1984.

Because of its massive scope and size, the Pins system provides Reagan's strategists with updated information about virtually any target voter group in quick turnaround time. When everyone else predicted a close race in 1980, the Pins system forecast an easy Reagan victory, which proved to be the case. How Pins will affect this year's election remains to be seen.

A BROAD VICTORY FOR IBM

IBM scored a TKO when it recently settled its four-year-old antitrust suit with 10 Common Market countries. Though the fighters both left the ring under their own steam, it was clear IBM had won yet another bout from a trust-busting challenger. Although the European Economic Community (EEC) won several concessions from IBM concerning its marketing methods in the European computer industry, the Armonk, N.Y.-based giant faces little adjustment of its practices in its multibillion dollar market abroad.

Among the most important concessions:

- IBM is now required to to provide technical specifications and instructions on all new 370-series products within four months of announcement.
- IBM's European customers are no longer required to buy bundled or predetermined amounts of main memory when purchasing a mainframe, thus giving rivals a chance to sell into that market.
- IBM promised to quicken the pace of publishing technical details on its Systems Network Architecture (SNA) protocols.
- IBM must continue its efforts to match SNA to the International Standards Organization/Open Systems Interconnection (OSI) standard adopted by many European companies already.

Industry analysts agreed that the settlement amounted to nothing more than a slap on the wrist for IBM and would not appreciably alter its marketing strategies in Europe. The mandate to provide technical specifications within four months of a product announcement is virtually a moot point; IBM tends to deliver its mainframe products within six months of announcement, anyway. In addition, the agreement does not affect the much more volatile market that includes IBM's Personal Computers, its distributed data processing systems or its minicomputers.

Analysts also pointed out that it is unlikely that customers will opt to buy main memory from anyone other than IBM if they are willing to make such a huge investment in an IBM mainframe. On the final points, IBM has already stated its intent to accommodate the user community by accepting the OSI standards, and it is only too happy to create more interest in SNA.

Despite industry agreement that IBM had won again, Big Blue's rivals were said to be pleased with getting any concessions at all. Indeed, since the U.S. dropped its 13-year antitrust battle with IBM in 1982, it appeared that IBM was immune to such litigation. Though they got little, the Europeans made a tiny dent, which is more than can be said at home.

TO THE SWEDES GOES VICTOR

STOCKHOLM, Sweden — Victor Technologies, Inc. always had better luck selling its product in Europe anyway. Thus the U.S.-based microcomputer maker, which filed for protection under Chapter 11 of the Federal Bankruptcy Act in February, wasn't too surprised that it was a Swedish firm that decided to buy control.

Datatronics AB, a computer and software company based in Stockholm, offered and Victor accepted $28 million for the troubled firm. The Swedish concern reportedly will pay $10 million for 90% of Victor's stock and will lend the company another $15 million to allow it to settle its $70 million unsecured and $14 million secured debts. Mats Gabrielsson, president of Datatronics, will become chairman of Victor and has indicated he will focus the company's sales in Europe. In addition, he said the company's management team would remain intact. Of the company's 300 employees, 260 are in the U.S.

Victor, which sells the Victor 9000 line of desktop computers, will continue its manufacturing operations in California, but its major sales have been and are expected to continue to be in the European market. Its 16-bit machine sells under the Sirius label abroad.

FROM CROW BARS TO COMPUTERS

WASHINGTON, D.C. — "As computers become daily working tools in the office, they also become tools for criminal purposes," said Congressman Bill Nelson (D-Fla.) "Instead of using crow bars, the high-tech thief is using computers."

Nelson has been the leading proponent of H.R. 5616, the Counterfeit Access Device and Computer Fraud Act, the federal computer crime law passed by 395-0 in a House vote in July. The bill, which combines penalties for computer crime and credit card abuse and includes many major provisions of the Federal Computer Systems-Protection Act, is now seeking Senate approval.

The legislation establishes penalties, including fines from $5,000 to twice the value obtained by the offense and imprisonment up to 20 years, against criminals who "knowingly access a computer (which affects interstate or foreign commerce) without authorization" and obtain anything of value aggregating $5,000 or more during any one year period. According to Nelson, this bill would finally give prosecutors a law with which they could go after computer criminals.

The legislation is being held up in the office of Sen. Paul Laxalt (R-Nev.), chairman of the Judiciary Committee on Criminal Law. According to a Judiciary Committee staff member, "It is not a well-drafted bill. There are some problems with the language, and it is very much up in the air right now as to how long it will take."

The Senate passed S.1870 in April, but that bill addresses only credit card abuse, not computer abuse. For more information on the bill, contact Congressman Nelson's office at 307 Cannon House Office Building, Washington, D.C. 20515.

BRIEFS

(Continued from Page 9)
and regulatory issues surrounding equal access and is available separately for $350 from Ernst & Whinney Telecommunications Group, 1800 First Interstate Plaza, Tacoma, Wash. 98402.

DELRAN, N.J. — The fate of microcomputer software lies in the development of integrated applications packages, according to a report by Datapro Research Corp.

The report, "All About Integrated Microcomputer Programs," said that only 17% of the products marketed as integrated software offer the three major business applications: word processing, data management and electronic spreadsheeting. Only 12% add graphics to this list. The report is available for $25 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SAN JOSE, Calif. — Portable computers will continue to make up the fastest growing segment of the personal computer market, according to a report by Dataquest, Inc.

The report, provided to clients of Dataquest's Small Computer Industry Service, predicted that the portable computer share of personal computer sales between $1,000 and $5,000 will grow from 26.5% to 38% in the next four years. For more information, contact Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

WELLESLEY, Mass. — While the market for combination telephone/desktop computers is enormous, it has been less difficult for manufacturers to integrate voice and data than to sell it, according to a study by Venture Development Corp.

"The CRT Phone Terminal Market: 1983-1987," predicts that although shipments of CRT phones will nearly double between 1983 and 1984, vendors will have to sharpen their selling as well as design skills if products are to appeal to more than just a fraction of potential users. The report is available for $2,970 from Venture Development Corp., One Washington St., Wellesley, Mass. 02181.

BOSTON, Mass. — Microcomputer network development is moving rapidly, according to a case study by Stanford University. Corvus Systems, Inc., Davong Systems, Inc., Nestar Systems, Inc., Novell Inc. and 3Com Corp. were the vendors examined in "Microcomputer Networks."

The study includes price comparisons and raises such issues as wiring, management, security and access, multiuser data bases, speed, capacity and architecture. It is available for $450 from Seybold Publications, Inc., 148 State St., Boston, Mass. 02109. OA

CUPERTINO, Calif. — **Apple Computer, Inc.** unveiled an upgraded version of its Macintosh personal computer, the Macintosh 512K. Priced at $3,195, the new version expands internal memory for the Macintosh from 128K bytes to 512K bytes.

A 512K Memory Expansion Kit for the Macintosh 128K will be available for $995.

Apple also announced a price reduction for the Macintosh 128K, which will now sell for $2,195, from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

BOCA RATON, Fla. — **IBM** unveiled its top-of-the-line personal computer, the PC AT, reportedly delivering almost five times the user memory and more than twice the storage capacity available on previous IBM personal computers.

The PC AT, with 256K bytes of user memory and a 1.2M-byte diskette drive, costs $3,995. With 512K bytes of user memory, a 1.2M-byte diskette drive and a 20M-byte fixed-disk drive, the PC AT costs $5,795. IBM also announced that its PC-DOS version 3.0 and the new PC Xenix operating systems will support the AT.

IBM also introduced the IBM PC Network, capable of linking up to 72 IBM Personal Computers, PC/XTs, Portable PCs and PC ATs through standard coaxial cable. A $595 IBM PC Network Translator Unit is required for each network and each microcomputer is connected to the net through a $695 IBM PC Network Adapter. The company also announced plans to connect the PC Network to its planned token ring local-area network.

In addition, the company unveiled Topview, a windowing software program allowing the Personal Computer, PC/XT, PC AT and Portable PC users to operate several different programs concurrently, switch data from one task to another or view data from several applications on a single screen using windows. Topview and the Topview Programmer's Toolkit, priced at $149 and $395 respectively, are scheduled for the first quarter of 1985.

The company also introduced two color graphics displays for the Personal Computer, PC/XT and PC/AT. The $1,295 PC Professional Graphics Display with $2,995 Professional Graphics Controller can generate 256 colors simultaneously. The $849 PC Enhanced Color Display with $524 Enhanced Graphics Adapter, slated for January 1985, displays up to 16 colors simultaneously from a palette of 64.

More information is available from IBM Entry Systems Division, P.O. Box 1328, Boca Raton, Fla. 33432.

RYE BROOK, N.Y. — **IBM** also announced Info Center/1, a software package designed to allow business professionals ready access to data bases. Info Center/1 encompasses three prior products including APLDI, FPS and ADRS along with business graphics and reportedly allows the user to query an organization's relational data through two of IBM's relational data base management systems — DB2 or SQL/DS.

Info Center/1 incorporates five information handling functions: entering and validating data; accessing and analyzing data bases; customized reporting; business planning modeling; and business graphics. The package is available for $32,000.

IBM also introduced two high-end models to its System 38 family and a low-end expansion to the 4361 processor series. The System 38 Model 40 reportedly has up to twice the memory and 70% greater internal performance than the current top-of-the-line Model 8 and costs $250,000 when configured with 12M bytes of memory and one disk drive. The System 38 Model 20 has 30% greater internal performance than the Model 8 and is priced at $175,000 with 6M bytes of memory and one disk drive, the company said. Both are scheduled for December.

The 4361 Model 3, available in December, costs $56,500 with 2M bytes of memory and $71,500 with 4M bytes of memory. IBM also announced 10% price reductions on the 4361 models 4 and 5.

For more information contact IBM, 900 King St., Rye Brook, N.Y. 10573

Corona's Mega PC

THOUSAND OAKS, Calif. — A multiprocessor, multiuser microcomputer system offering both IBM PC/XT compatibility and shared integrated system processing has been introduced by **Corona Data Systems, Inc.** Called the Corona Mega PC, the system supports up to eight user workstations and is designed to be compatible with the Corona PB400 desktop and IBM PC/XT computers.

Reportedly offering the speed and flexibility of a local-area network, the Mega PC houses a Main File Server Board incorporating an 8088 microprocessor and 256K bytes of random-access memory (RAM). The central system unit also houses an additional board containing 11 IBM PC-compatible bus expansion slots. Up to eight slots can be used for Applications Processor Cards, each incorporating an 8MHz 8088-2 microprocessor.

Each workstation terminal consists of a monitor, a detachable 83-key keyboard featuring IBM PC layout and the MS-DOS operating system and GW Basic as bundled software. A two-user Mega PC with a 10M-byte hard-disk drive lists for $7,805 from Corona, 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

MAYNARD, Mass. — **Digital Equipment Corp.** announced a new top-of-the-line microcomputer with performance reportedly on the level of a mid-range minicomputer. The Micro PDP-11/73 is an upgraded version of the original Micro PDP-11 and contains the company's J-11 microprocessor chip set.

Targeted to both end users and OEMs that require a high-performance multiuser system, the new system reportedly offers applications for engineering, manufacturing, office automation, communications, medical, education and small businesses. The Micro PDP-11/73 is compatible with DEC's PDP-11 minicomputers and runs 10 operating systems, enabling users to migrate numerous high-level language application programs without rewriting them, the vendor said.

Packaged systems are available with a 31M-byte Winchester hard disk and either dual 5.25-in. diskette or 60M-byte streaming-tape-cartridge backup drives. It is priced at $7,800 in a rack-mount version. Packaged systems begin at $15,140.

DEC also announced the Professional 380, the new top-of-the-line model for its Professional computer family, and a 33M-byte disk subsystem for the Professional 350 and 380 systems. The Professional 380, a single-user workstation based on DEC's J-11 chip set, reportedly offers twice the speed and graphics resolution and more expansion capacity than the Professional 350. The product, which runs many of the same application programs as DEC's PDP-11 minicomputers, is base-priced at $8,995 with monochrome monitor, keyboard and 10M-byte hard disk.

The RCD52 5.25 in. mini-Winchester disk subsystem, providing over five times the previously available storage capacity for the Professional 300 line, costs $3,995 from DEC, Maynard, Mass. 01754.

NEW YORK — A Unix-based, international Telex network that reportedly enables businesses to act as their own private communications carriers was unveiled by **Progressive Systems, Inc.** System 2 transmits Telex messages over high-speed switched voice lines from the U.S. to a node in the UK, then to the British Telecom Telex for delivery worldwide and

The System 2

reportedly cuts message costs by 60% to 80%.

The menu-driven system, implemented on a 32-bit superminicomputer and configured with 1M byte of internal memory, 100M bytes of disk memory, 8 communications lines and port capacity for 8 additional printers and terminals, costs $78,000 from Progressive Systems, Inc., 80 Broad St., New York, N.Y. 10004.

HAUPPAUGE, N.Y. — **Applied Digital Data Systems, Inc.** introduced its Adds PC/I and Adds PC/II intelligent workstations/personal computers, which are reportedly fully compatible with the IBM Personal Computer. The standard Adds PC/I configuration of CPU with 256K bytes of memory, dual floppy disk drives, keyboard and monochrome monitor is available for $2650. The Adds PC/II with 10M-byte Winchester disk drive is priced at $4200 from Adds, 100 Marcus Blvd., Hauppauge, N.Y. 11788.

BOSTON — **Integrated Planning, Inc.** announced an enhancement to its Stratagem mainframe decision support system, linking it to microcomputers running Lotus Development Corp.'s 1-2-3. The micro-to-mainframe link enables users to upload spreadsheet data into Stratagem or to send information from the mainframe into a Lotus worksheet.

Integrated Planning also introduced a version of Stratagem that will run on Digital Equipment Corp.'s VAX-11 line of minicomputers operating under VMS. The micro-to-mainframe upgrade will be provided free to all Stratagem users and will be included in all future installations. The VAX version of Stratagem costs from $30,000 to $60,000 for a perpetual license, from Integrated Planning, Inc., 338 Newbury St., Boston, Mass. 02115.

SAN DIEGO — A coaxial IBM 3178 plug-compatable display terminal was introduced by **Term-Tronics, Inc.**

Options on the Miracle include multihost communication allow-

ing users to access both Digital Equipment Corp. and IBM mainframes; character- and block-mode Ascii emulators; and IBM 3278, Model 5 132-char. screen formats.

Base price for the Miracle is $995 from Term-Tronics, Inc., 7408 Trade St., San Diego, Calif. 92121.

HOUSTON — **Zaisan, Inc.** introduced the ES.3 professional workstation, an IBM PC-compatible integrated voice and data terminal. The product combines in a single footprint 128K bytes of user memory, expandable to 640K bytes; a 360K-byte 5.25-in. diskette drive; an executive telephone featuring auto dialing; an internal 300-bit/sec direct connect modem; a 9-in. nonglare screen; and a detachable keyboard.

The ES.3 uses Z-80, Cmos 6805 and 8088 microprocessors, reportedly allowing the telephone and computer to operate independently or in tandem. The unit costs $2,595 from Zaisan, Inc., 13010 Champion Forest Drive, Houston, Texas 77069.

OLD TAPPAN, N.J. — **Prentice-Hall, Inc.** announced that its VCN Execuvision presentation graphics program is now available for the IBM PC/XT in addition to the PC. The MS-DOS 2.0/2.1 version of the package is priced at $395. An upgrade from the MS-DOS 1.1 format is available for $50.

Prentice-Hall also introduced six VCN Execuvision graphics libraries of prerendered drawings, symbols, maps and other images for integration into presentations. The libraries, grouped according to theme, cost $80 to $90, from Prentice-Hall, Inc., Business and Professional Division, Customer Service Department, 200 Old Tappan Road, Old Tappan, N.J. 07675.

CONCORD, Mass. — **Xyplex, Inc.** introduced two products linking Xyplex users with IBM Personal Computers, IBM mainframes and Digital Equipment Corp. VAX-11 computers.

The Xyplex Host Interface Unit for IBM mainframes provides IBM protocol conversion for asynchronous Ascii terminals connected to the Xyplex System. It is available for $7,700.

The Xyplex IBM PC Controller is a peripheral controller board emulating the IBM RS-232 communications port, increasing potential data transfer speed between an IBM PC and a VAX/VMS computer to over 100,000 bit/sec. It is scheduled for the fourth quarter for $960.

Xyplex also announced the XP-GTY Gateway and CATV broadband compatibility for its Xyplex System. The $5,800 XP-GTY Gateway reportedly provides remote communications facilities linking a terminal with a host computer regardless of its location. The Xyplex System uses a single channel on the CATV cable, specified upon order.

For more information, contact Xyplex, Inc., 100 Domino Drive, Concord, Mass. 01742.

Casher's Tracs

BROOKLINE, Mass. — Tracs, an integrated hardware and software system designed to monitor and control archival records activity, was introduced by **Casher Associates, Inc.**

Tracs locates available space for storage, monitors withdrawal and return activities of all files, generates dunning notices, automatically bills users for storage or activity and greatly reduces the risk of human filing errors, according to the vendor.

The package runs on Digital Equipment Corp. computers and is available for $55,000 for the basic configuration (including 25,000 files) or $65,000 for the extended version — including all hardware and software — from Casher Associates, Inc., 1371 Beacon St., Brookline, Mass. 02146.

MENLO PARK, Calif. — **Oracle Corp.** announced the release of its Oracle relational data base management system for the IBM PC/XT and PC AT. The package is identical to the Oracle that runs on mainframes and minicomputers and programs written for SQL/DS or DB2 will run unmodified on the PC version of Oracle, the vendor said.

PC Oracle requires 512K bytes of memory on a microcomputer and is available for $1,000 per copy with a minimum order of $6,000 from Oracle Corp., 2710 Sand Hill Road, Menlo Park, Calif. 94025.

PALO ALTO, Calif. — **CXI, Inc.** unveiled two advanced, 5-in. interface boards and supporting software for IBM and IBM-compatible personal computers. The 3278/79 Plus PC connections, available either as a coaxial connection or as a modem connection, reportedly perform full 3278/79 emulation as well as some 3270 PC capabilities, enabling a personal computer to access 3270 applications on a host computer and concurrently run standard PC applications software.

The 3278/79 Plus is available as a coaxial connection for attachment to IBM cluster controllers and as a modem connection for remote attachment emulating a 3274. The CXI 3278/79 Plus PC Modem Connection is a synchronous serial interface board and, according to the vendor, provides Systems Network Architecture/Systems Data Link Control networking functions for connection via modem and communications to a 3705/3725 communications controller.

Both the Coaxial Connection and Modem Connection are available for $1,145 from CXI, 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

NEW YORK — **Information Builders, Inc.** announced Tabletalk, the first in a series of "Talk" technology products for its mainframe Focus package, the fourth-generation nonprocedural data base and information management system which targets the information center.

Tabletalk reportedly allows a new mainframe computer user to develop complex, error-free reports by positioning the cursor to answer questions that appear in windows on the screen. The window-driven natural language technology is based on the artificial intelligence concept of visual assistance which guides the user through the development process without keyboard typing.

Tabletalk is available for $8,400 for a one-time license or $240 for a monthly license from Information Builders, 1250 Broadway, New York, N.Y. 10001.

PORTLAND, Oregon — **Concept Technologies, Inc.** introduced the Concept 100 system, a combination of hardware and software that reportedly converts an IBM PC or PC/XT into a publishing workstation. The product allows users to incorporate graphics with text, producing final manuscripts, and even camera-ready copy for some types of projects, according to the vendor.

The Concept 100 costs $2,195. It requires an IBM PC with hard disk or IBM PC/XT, features an Intel 80186-based intelligent graphics subsystem, Wang-like word processing, a graphics editor, charting capabilities and a mouse. More information is available from Concept Technologies, Inc., P.O. Box 5277, Portland, Ore. 97208. OA

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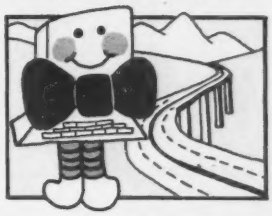

The German computer market is the largest in Europe and the third largest in the world. It has over $11 billion in installed general purpose computers. The fastest growing segment of the German computer market is the microcomputer, with an installed value of $283 million. There were 10,000 IBM PC's sold in 1983 and another 30,000 units including IBM PCjr's are expected to be installed by the end of 1984.

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CALENDAR

Oct. 15, Washington, D.C. — **Introduction to Micros.** Also, Oct. 22, Dallas; Oct. 29, Boston; Nov. 13, Chicago; Nov.27, Atlanta; Dec. 3, Los Angeles; Dec. 10, Washington, D.C. Contact: U.S. Professional Development Institute, Microcomputers in Government, 1620 Elton Road, Silver Spring, Md. 20903.

Oct. 15-17, New York — **The Future of Optical Memories, Videodisks and Compact Disks to the Year 2000.** Contact: Joanna Spilman or Judy Hanson, Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114-0817.

Oct. 16-18, Washington, D.C. — **Getting Ahead With Micros.** Also, Oct. 23-25, Dallas; Oct. 30-Nov. 1, Boston; Nov. 14-16, Chicago; Nov. 28-30, Atlanta; Dec. 4-6, Los Angeles; Dec. 11-13, Washington, D.C. Contact: U.S. Professional Development Institute, Microcomputers in Government, 1620 Elton Road, Silver Springs, Md. 20903.

Oct. 17-19, Washington, D.C. — **Local-Area Networks.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 22-23, Chicago — **Local-Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Oct. 22-23, Chicago — **Software Tools for Distribution Decision Support Systems.** Also Oct. 29-30, San Francisco. Contact: Software Tools Conference, Suffolk University, Boston, Mass. 02108.

Oct. 22-24, San Francisco — **The Integrated Voice/Data PBX: Architectures and Products.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 22-26, San Antonio, Texas — **Human Factors Society 28th Annual Meeting.** Contact: Trinity University, Office of Continuing Education, 106 Oakmont, San Antonio, Texas 78212.

Oct. 22-26, New York — **The James Martin Seminar.** Also, Oct. 29-Nov. 2, Detroit; Nov. 26-30, Dallas; Dec. 3-7, Los Angeles. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 23-24, Boston — **Information Centers.** Also, Dec. 12-13, Denver. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Oct. 24-25, New York — **IBM vs. AT&T: Round One.** Also, Nov. 1-2, San Francisco; Nov. 27-28, Chicago. Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

Oct. 25-28, San Francisco — **2nd PC Faire.** Contact: Computer Faire, 181 Wells Ave., Newton, Mass. 02159.

Nov. 4-7, Anaheim, Calif. — **Data Processing Management Association Anaheim '84 International Conference and Business Expo.** Contact: Doris Dodge, DPMA, 505 Busse Highway, Park Ridge, Ill. 60068.

Nov. 6-8, Washington, D.C. — **Federal Office Automation Conference.** Contact: National Council for Education on Information Strategies, P.O. Box N, Wayland, Mass. 01778.

Nov. 14-18, Las Vegas — **Comdex/Fall 1984.** Contact: Trade Sales Department, The Interface Group, Inc., 300 First Ave., Needham, Mass., 02194.

Nov. 26-28, San Francisco — **Computer Graphics for Business.** Contact: Technology Transfer Institute, 7412 10th St., Santa Monica, Calif. 90402.

Nov. 28-30, Boston — **Information Center Software Selection.** Also, Feb. 25-27, Atlanta. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

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